

ELECTRIC LIGHT & POWER

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FERC OKs Pacific merger

Utah PSC studies effect of wheeling conditions for UP&L

WASHINGTON—PacifiCorp's Pacific Power & Light Co. and Utah Power & Light Co. may have gotten over the final hurdles—including imposed wheeling guidelines—in their merger efforts.

Rehearings by the Utah Public Service Commission on Nov. 8-9 and Nov.

28-29 weren't expected to obstruct the merger. Utah state regulators previously approved the merger, but reserved the right to suspend that decision if federal regulators placed conditions on the deal. The Utah PSC suspended its approval, three hours after the FERC decision, to assess the merger effects on that state's interests.

Wheeling rules: not much effect

Stipulations in the Federal Energy Regulatory Commission's approval of the merger are estimated to reduce the profitability of the combination by \$5 million over five years, said Chris Hunter of PacifiCorp. That "minimal effect" apparently was not enough to dissuade

the utilities, and is not expected to change the minds of Utah regulators.

The combined utility promised to decrease Utah power rates by 2 percent in 60 days and a total of 5-10 percent in three to five years, Hunter said. With that promise, customers are guaranteed savings, and risk falls to management and shareholders. Anticipated savings from the merger were projected by the companies at \$500 million over five years.

Under the merger agreement, UP&L stock would be converted into PacifiCorp stock at a value ranging from \$32.25 to \$38 per share, for a total transaction worth about \$1.9 billion.

Continued on page 11

SDG&E and TEP break merger; SCEcorp is ready

Mark T. Hoske
Assistant Editor

SAN DIEGO—The engagement with TEP is off, and SCEcorp is still courting the utility next door.

San Diego Gas & Electric Co. split with Tucson Electric Power Co. over its disagreement about how to thwart SCEcorp's efforts to block their planned merger. The engagement lasted from June to November.

As of press time, SDG&E said it was examining other choices, including accepting SCEcorp's \$2.4-billion unsolicited merger offer.

"Now that the Tucson Electric deal has been terminated, we need to carefully consider our alternatives. These include remaining independent, pursuing a possible combination with SCEcorp and other extraordinary transactions," explained Thomas A. Page, SDG&E chairman and chief executive officer.

A representative from SDG&E would not elaborate on any of those points.

SDG&E had previously turned down SCEcorp's beefed-up buyout offer after asking for an extension for more time to consider (EL&P, Oct., p. 1). SDG&E argued that the benefits to merging with SCEcorp were short-term. After the offer was rejected, SCEcorp still left it open.

SCEcorp's efforts to block the TEP/SDG&E merger were expected to significantly complicate the regulatory process in the California and Arizona, as well as at the Federal Energy Regulatory Commission.

These issues led the TEP and SDG&E boards to conclude that it was in the best interests of the respective companies and stockholders, employees, and customers to terminate the merger agreement.

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LATE NEWS

Texas Utilities Electric Co. supplies Waxahachie, TX, a small town south of Dallas, and the planned site for the \$4.4-billion superconducting supercollider.

With an anticipated peak demand of about 180 MW, the project is expected to generate annual revenues of about \$50 million for TU and bring 3500 permanent jobs to the area. Don Raburn, director of investor relations, expects \$50 million more from stimulus of the region's economy.

Debate over site selection and funding is expected, especially since the selection came just two days after Texas Governor George Bush won. Part of the boost for Texas over six other finalists was a \$1-billion incentive package of bonds and services. If Congress approves, construction could begin in 1990, with operation in 1997.

Duke Power cuts 1200 employees; preparing for 1990s

CHARLOTTE, NC—Duke Power Co. is trimming 1200 employees, about 6 percent of its workforce, the third utility to make major cuts in five months.

In recent months, Tennessee Valley Authority and Public Service New Mexico cut back by 20 percent. Arizona Public Service has also been streamlining.

Duke Power, on a strong financial footing, previously announced it might have to cut up to 10 percent of its people to avoid rate increases through the early 1990s.

Over two months, company managers were asked to carefully identify where cuts could be made in the 20,800-person workforce.

"This review has allowed us to identify ways we can better control costs and achieve rate stability for our customers," said Bill Lee, Duke Power chairman. That review is leading to the layoff or early retirement of about 1200.

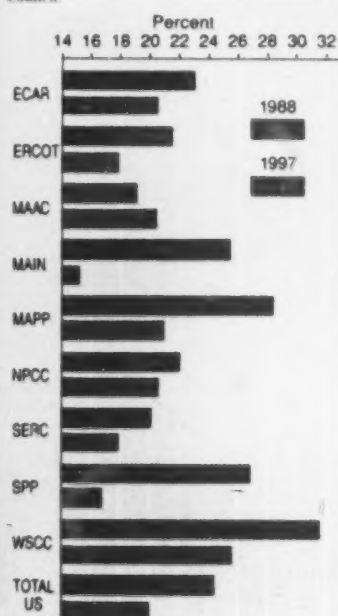
About 350 are from the headquarters in Charlotte, about 500 from other

Continued on page 11

CAPACITY MARGINS

Capacity margins vary, but are projected to be "at risk" by 1997 in several NERC regions. Margins are based on generating capacity that exists, is under construction or is planned, plus scheduled purchases from other utility or nonutility generators, less any sales. A margin is the amount planned capacity exceeds projected peak demand. The percent margin shown is an area's margin divided by its total planned capacity (multiplied by 100).

The areas are: ECAR—East Central Area Reliability Coordination Agreement; ERCOT—Electric Reliability Council of Texas; MAAC—Mid Atlantic Area Council; MAIN—Mid America Interconnected Network; MAPP—Mid-Continent Area Power Pool; NPCC—Northeast Power Coordinating Council; SERC—Southeastern Electric Reliability Council; SPP—Southwest Power Pool; and WSCC—Western Systems Coordinating Council.



Source: North American Reliability Council



Air-cooled generator readied for testing

One of three General Electric Co. 6A3 advanced-design, air-cooled generators is loaded onto a railcar at the company's Schenectady, NY, test facility prior to undergoing engineering performance specification tests. It was shipped in mid-October to Exxon Chemical Co.'s Baytown, TX, plant as part of a GE MS6001 gas-turbine, packaged power plant. The two other 6A3 generators and turbines were shipped to the site in August and September. The three units will be used in a cogeneration plant to provide process steam and 100 MW of electric power to the Baytown plant. The cogeneration plant is expected to begin commercial operation by February 1989. The 6A3, a new version of GE's 6A2 generator, can produce 28-35 MW of electric power when used with a steam turbine or up to 38 MW when coupled to a gas turbine.

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NRECA and EPRI to cosponsor agricultural research program

The National Rural Electric Cooperative Association and the Electric Power Research Institute (EPRI) have teamed up to sponsor a technical research program for the agricultural sector. According to EPRI, the organizations will provide "seed money" to universities for three years to stimulate basic research in using electricity-based technologies to benefit the nation's agriculture.

EPRI creates office, forms new division

In other news, the Electric Power Research Institute has created an Office of Corporate and Commercialization Development and has formed a consolidated Generation and Storage Division. EPRI said it formed the new division by merging its Advanced Power Systems (APS) and Coal Combustion Systems (CCS) divisions, as well as its Plant Electric Systems Rotating Machinery and Materials Support programs. Former CCS Director Kurt Yeager will head the Generation and Storage organization, according to EPRI. Dwan Spencer, who was previously director of the APS division, was named director of the new Office of Corporate and Commercialization Development.

C-E to acquire energy management business

Combustion Engineering, Inc. (C-E) recently announced its intent to acquire Systems Control, Inc.'s Energy Systems

Group (ESG). ESG is a supplier of energy management systems, supervisory control and data acquisition systems, and advanced application software to the electric power industry. According to C-E, ESG will operate as part of its Utility and Industrial Controls business.

General Signal Corp. consolidates units

General Signal Corp. said it has merged three of its electrical equipment business units, Hevi-Duty Electric, Dowzer Electric and Nelson Electric, into one. The new company, Hevi-Duty Electric, will be headquartered in Goldsboro, NC. According to General Signal, the units were consolidated to better serve its primary electric utility and electrical distributor customers.

CIGRE calls for papers

The International Conference on Large High Voltage Electric Systems (CIGRE) announced a call for technical papers and films for its next biennial session in Paris, France in August 1990. According to CIGRE, abstracts not exceeding 500 words must be submitted before March 1, 1989. For more information contact: U.S. Technical Committee Chairman H.N. Scherer, Jr., c/o D.J. Rogier, American Electric Power Service Corp., One Riverside Plaza, Columbus, OH, 43215 or phone (614) 223-2289.

Gilbert, Halcrow form new joint venture firm

Gilbert Associates (Europe), Ltd. and Halcrow & Partners,

Ltd. have formed a consulting engineering company, Halcrow Gilbert Associates (HGA). The joint venture will focus on the computer-based controls and telecommunications field, as well as support of power generation and offshore oil production needs. Headquartered in Swindon, Wiltshire, England, HGA said it plans to target selected market segments primarily in Europe, with future expansion into other international areas of mutual interest. Gilbert Associates (Europe) is a subsidiary of Gilbert Commonwealth, Inc. which is helping to sponsor the joint venture.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:

Commonwealth Edison Co. A \$50,000 fine for one violation of NRC security requirements involving inattentive guards at the Braidwood nuclear plant.

A \$125,000 fine for two violations of NRC safety requirements at the Quad Cities nuclear power station.

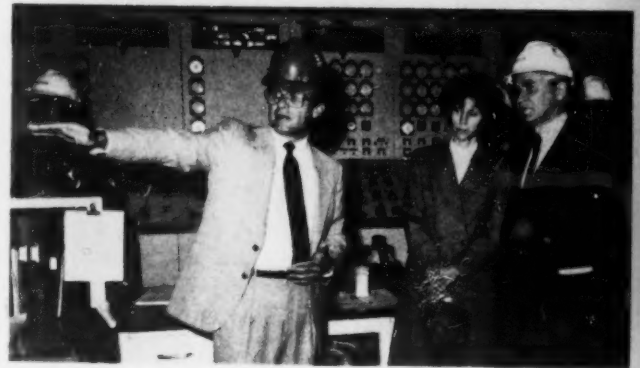
Consumers Power Co. A \$187,500 fine for failing to adequately test some electrical components at the Big Rock Power nuclear plant.

Omaha Pub. Power District A \$50,000 fine for alleged violations of NRC requirements in the operation of the Fort Calhoun nuclear plant.

PSNH restructures top management

In order to emphasize customer service and strengthen its bankruptcy reorganization efforts, Public Service of New Hampshire said it has appointed

Soviet ambassador tours NYPA project



Yuri Dubinin, Soviet ambassador to the United States (right), recently toured New York Power Authority's Niagara Power Project during a visit to Niagara Falls. Ronald Camaga, superintendent of technical services at the project, explained the operation of the control room while NYPA Community Relations Manager Joanne Wilmott looked on.

ed four senior vice presidents. John P. Edwards was named senior vice president-customer affairs; Charles E. Bayless will serve as senior vice president and chief financial officer; D. Pierre G. Cameron, Jr. was chosen as vice president and general counsel; and Ralph S. Johnson was appointed senior vice president responsible for PSNH's engineering function.

NIRMA board selected

The Nuclear Information and Records Management Association has chosen its board of directors for the 1988-89 term. Hans Ebner, Jr. of Detroit Edison was named president; Tennessee Valley Authority's Karen Ledbetter was appointed vice president; treasurer is Michael Murphy of Public Service Electric & Gas Co.; and Thomas Reding of Northern States Power Co. was named secretary.

Promotions announced at Duke Power Co.

Duke Power Company recently announced the following promotions: Richard B. Priory to senior vice president-generation and information services; William A. Coley to senior vice president-power delivery; Theodore C. McMeekin to vice president-design engineering; Richard J. Osborne to vice president-finance; and Sue A. Becht to treasurer.

Starr receives medal, named to Hall of Fame

Electric Power Research Institute President Emeritus Chauncey Starr recently received the Rockwell Medal and was admitted to the world level Hall of Fame for Engineering, Science and Technology. According to EPRI, the Rockwell Medal recognizes Starr's contributions to the generation, transfer and application of technology for the betterment of mankind. Starr was vice chairman of EPRI from 1978 to 1988 following five years as the founding president. Before serving as Dean of UCLA's School of Engineering and Ap-

plied Science, Starr was vice president of Rockwell International and president of its Atomic International Division.

Energy innovation award winners selected

Seventy-four projects were chosen to receive National Awards for Energy Innovation as part of a government program to identify and recognize the best energy-saving ideas from each state. Energy Secretary John S. Herrington presented the awards to the winners who included school districts, private corporations, small businesses and local government, as well as individuals. They were selected from recommendations submitted by 36 states and the District of Columbia, according to DOE.

Asea Babcock to supply AEP with PFBC system

American Electric Power Co. plans to negotiate a contract with Asea Babcock for supply of a pressurized fluidized bed combustion system for its Sporn Project. The Sporn Project was chosen by the Department of Energy for funding under the Innovative Clean Coal Technology Program. According to Asea Babcock, construction of the PFBC plant would begin in early 1993 with initial operation scheduled for late 1995. Asea Babcock said the 330-MW project will be the largest PFBC plant ordered to date in the world.

More SCADA system orders for Landis & Gyr

The Tennessee Valley Authority recently purchased four supervisory control and data acquisition (SCADA) systems from Landis & Gyr, to control operations at seven hydroelectric generating plants in remote locations in the Appalachian Mountains. Landis & Gyr also reported sales of one SCADA system each to: Jefferson Davis Electrical Cooperative, Inc. of Louisiana; the Indiana Municipal Power Agency; and the city of Alexandria, LA.

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USCEA gave a party but almost nobody came

Ever go to a party, and find that the guest of honor didn't show up? Or more to the point, ever give a party where nobody showed up? If you have, then you can understand the mood at the recent Nuclear Energy Forum, held in Washington, DC, in early November.

The Nuclear Energy Forum, for the benefit of *EL&P* readers who do not follow developments in the power generation arena, is sponsored by the U.S. Committee for Energy Awareness, the successor to what used to be called the Atomic Industrial Forum. The annual fall conference has been held for years in conjunction with the fall meeting of the American Nuclear Society, alternating years in Washington, DC, and on the west coast, usually San Francisco.

One of the pains that results from being a long-time reporter and observer of industry activities is remembering and comparing events. I especially recall one of my first AIF meetings, held in Miami Beach back in '71 or '72, I believe. It was some wingding! Eight hundred to a thousand or more crowded the meeting room, special presentations, fancy receptions, dinners, scheduled press conferences competing for editors and reporters' time. A far cry from this year's get-together!

Granted, nobody in the know would expect a nuclear industry conference or convention today to match up with those from the golden days of nuclear power development. But I can't believe anybody expected the gaunt, emaciated appearance of the nuclear industry that confronted this year's meeting.

The first session was held in conjunction with ANS at the ANS' hotel. Attendance was good, though not huge. But then the Nuclear Energy Forum meetings shifted back to the USCEA's hotel, and the true condition of the industry became apparent.

The AIF's annual fall get-togethers used to be attended by utility, manufacturer, architect-engineer and government executives. Chairmen, presidents and vice presidents crowded together with nuclear engineers and managers, sales and marketing types, and government officials. There were lots of young, enthusiastic faces in the crowd. But no longer!

This year the ballroom where the NEF meetings were held was chopped down by a movable wall, and surrounded by a semicircular balcony that further reduced usable floor space. About 56 round dinner tables, large enough to accommodate 10 each, were positioned in front of the speaker's platform. A few tables had three registrants seated at them, but most had one or two. Most tables around the edge of the truncated room were unoccupied. For that first session at USCEA's hotel, I estimated about 150 people at the beginning, but toward the end, a Washington reporter counted the heads and got just 84. In the morning session two days later I counted less than 70. Few of these were what could be considered young.

While USCEA staff and many speakers tried to sound optimistic, there was little real enthusiasm. Most of the conference focused on the continuing growth of nuclear power in Europe and Asia and the severe problems threatening the industry here in the U.S.

There were no realistic solutions offered for the near term. None of the speakers or NEF officials held out any hope for even midterm recovery for the nuclear power industry. Long term, perhaps, a major series of electrical catastrophes could open the door for future development. The more optimistic held out hope of some new nuclear orders in the early years of the next century.

In the meantime, we can expect the number of surviving members of the nuclear equipment manufacturing industry to decrease. For many, time is running out. One can only wonder if there will be a U.S. nuclear industry capable of building the next generation of nuclear plants if and when the time comes that utilities, or other potential generators, are ready to order a new nuclear unit.

A couple of more years of decline and the NEF could be held in the back room of any of a number of Washington watering holes. It's hard to envision this as the nucleus of the long-term salvation of the electric industry.

Robert A. Lincicome, Editor-in-Chief

Operator fines

The commentary in September's issue on shared responsibility between utilities and individual employees for improper actions ("NRC's penalty policy takes a turn," p. 4), was correct as far as it went.

However, in a case like that of shiftworkers sleeping at the Peach Bottom nuclear facility it would seem that

the employees' labor union should also be held accountable along with the employer.

When unions are called to answer for their members' transgressions, we will start to see a little more common sense and realism at the bargaining table.

R. Jeustime

Florida Power & Light Co.
St. Lucie Nuclear Plant
Jensen Beach, FL

Prudence review complexity challenges utility plant

Ivor Samson
Marron, Reid & Sheehy

SAN FRANCISCO—The "regulatory compact" that had, in effect, guaranteed public utilities a fair rate of return in exchange for their obligation to provide secure service to an ever-growing demand, in many cases, disintegrated.

This dramatic change was seen in the events that would have been unthinkable only a few years ago, such as the potential bankruptcy of Public Service Company of New Hampshire, the Washington Public Power Supply bond failure and the spectre hanging over Long Island Lighting Company as a result of the Shoreham debacle.

This disintegration has been caused by the rise of consumerism, falling demand for electricity, rapidly changing fuel prices, competition within service territories, and new sources of energy, all within a general framework of deregulation in an age of uncertainty.

A major change in the regulatory process is the "prudence review," an "after-the-fact" evaluation of management decisions and processes, generally conducted in order to determine what capital costs or operating expenses should be passed on to ratepayers. It's Monday morning quarterbacking with billions of dollars at stake.

The post-hoc regulatory review of individual management decisions, once rare, is now becoming increasingly common. The issue is most often raised in ratemaking proceedings, either to recover operating expenses or to place new capital facilities into rate base. Generally, only expenses that are "reasonably and prudently incurred" can be recovered through rates or included in rate base. In order to determine what expenses were reasonably incurred, public utility commissions, staffs and intervenors have increasingly tended to focus upon the adequacy of management's decision-making processes and the ultimate correctness of individual management decisions.

Not only for new plant

These "prudence reviews" have investigated such diverse areas as fuel procurement practices, plant performance and plant outage practices, and generation planning methods. Amounts disallowed have ranged from several million dollars for improper maintenance procedures to \$1.4 billion for imprudent construction and management practices at the Shoreham nuclear plant.

They will undoubtedly become the focus of regulations in "deregulated" natural-gas markets, where state utility commissions will conduct after-the-fact evaluations of the fuel procurement practices of distribution utilities.

But nowhere has the inquiry been as intense or the development of methodology and standards so rigorous as in the retrospective review of power plant construction costs—especially these involving nuclear power plants.

To date, there have been over two dozen prudence reviews of nuclear power plants. Because of the complexity and magnitude of these reviews, certain criteria and practices have evolved which are equally applicable to, and will eventually be applied to, virtually every aspect of a regulated utility's business.

The tremendous increases in cost, allegations of management imprudence, schedule extensions, etc., that have often been associated with nuclear plants in the public's mind, have resulted in them, as a class, being the first focus of public utility commission-directed reviews. But this is a short-term phenomenon; when the management of the construction of the last nuclear plant has been reviewed, the concept of a comprehensive prudence review of management decisions as a regulatory tool will still be here to stay.

A prudence review, or reasonableness review, is a comprehensive, systematic analysis of both the outcome of a particular project or management action and of the management decisions and the processes that underlie that project or action. In the case of large power plants, where construction stretches over many years and involves thousands of separate decisions, a prudence review can be a tremendous undertaking involving hundreds of people and thousands or even millions of documents.

In other cases the numbers may be smaller but the intensity of focus on specific issues may be that much greater. In every case, the after-the-fact prudence review is changing the way in which utilities make decisions and conduct business.

The following general guidelines have evolved primarily from reviews of nuclear construction projects but are generally applicable to other aspects of management review:

The "reasonable man standard" is the measure by which prudent conduct is determined. In the recent San Onofre decision, the California Public Utilities Commission articulated this standard as meaning that "...the utilities' actions should comport with what a reasonable manager of sufficient education, training, experience and skills, using the tools and knowledge at his disposal, would do when faced with a need to make a decision and act."

Prudence can only be objectively assessed by evaluating management decision-making in the context of what was known or reasonably knowable at the time of the decision. Prudence does not require prescience.

Decision not viewed

No management decision is made in a vacuum. Specific inquiry into narrow areas of decision-making must recognize that a larger corporate purpose might have been served by an apparently sub-optimal choice in the study area, e.g., not allocating sufficient personal

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U.S. waste-to-energy: A status report

Jonathan V.L. Kiser
Research Analyst
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Utilities' primary interest in waste-to-energy is energy production—electricity and/or steam. Government officials see a more central purpose—environmentally sound garbage disposal.

Energy sales from such plants help offset operating and maintenance costs and minimizes the "tipping fees" charged to facility users, those hauling the garbage.

More than 11,600 tons per day, or more than 230 MW, of additional waste-to-energy plant capacity became operational in 1987, according to Kidder, Peabody & Co., in their Dec. 31, 1987, *Status Report on Resource Recovery*. This marked more than a 100-percent increase over 1986 new capacity, and translates to an average of 20 MW per 1000 tons per day of garbage processed. The conversion varies with factors such as system technology, waste-stream characteristics and operating conditions.

A few utilities have entered waste-to-energy industry by planning, owning or operating such plants themselves; oth-

Focus On Waste to Energy

ers are involved only by purchasing the power the plants produce. Potential for waste-to-energy growth increases with dwindling landfill capacity.

Facility ownership and operation

Ownership and operation of waste-to-energy facilities are divided among private firms, including utilities, and public or governmental entities. A recent Governmental Advisory Associates (GAA) survey polled representatives at 111 existing waste-to-energy plants and an additional 91 communities planning to implement facilities. See the table for a summary of ownership and operation.

Industry representatives expect development of new waste-to-energy projects to slow during the next several years because of local opposition to such plants. Over the next decade, however, growth is predicted. Approximate-

ly 10 percent of U.S. refuse is burned now, according to U.S. Environmental Protection Agency figures. Michael Flynn, EPA's acting chief of Special Wastes Branch, forecasts that this figure will increase to 16 percent by the year 2000.

Waste-to-energy plants can reduce garbage 90 percent by volume and 70 percent by weight to help preserve landfill capacity. The added benefits of providing steam, electricity, and, in some plants, recycled resources, make waste-to-energy an attractive alternative, despite siting challenges, and regulatory and congressional concerns about emissions and ash disposal.

Incineration plants go way back

Garbage burning is a centuries-old practice. In the late 19th century, simple brick chambers began to emerge, offering a more-controlled approach than open burning. Over time, mass-burn incineration plants became widely used, first in Europe and then in the United States.

As of 1966, nearly 300 U.S. incineration plants were operating, capable of burning approximately 30-million tons of refuse annually, according to Robert Brickner, senior vice president with

Gershman, Brickner & Bratton Inc., solid-waste management consultants of Falls Church, VA. Most facilities were shut down due to noncompliance with EPA air-emissions standards.

During the early 1970s, some 14 waste-to-energy facilities that differed significantly in design and function from the old-fashioned incinerators were built. The early 1980s fueled additional growth, in response to greater waste-management demands, rising fossil-fuel prices, tax incentives, and the passage of the Public Utilities Regulatory Policies Act of 1978.

From 1980 to 1984, 42 facilities began operating, according to GAA, which is based in New York, NY. From 1985 to the present, an additional 53 came on-line.

Unlike the early incinerators, today's waste-to-energy facilities meet, and often exceed, pollution-control requirements in the following ways:

- High-temperature combustion temperatures (1800-2200 F) break down complex chemical compounds into simpler, less harmful components.
- The best available control technologies (BACT) capture and remove more than 95 percent of the remaining gases and fly ash. These technologies include acid-gas scrubbers, electrostatic precipitators and fabric filters.
- Continuous emissions monitoring (CEM) tracks the level of specified air pollutants and operating conditions and helps achieve optimal combustion

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Outlook brightens for power from waste-to-energy plants

Increasingly, waste-to-energy plants are becoming part of utilities' generating mix. The number of plants have grown due to society's need for reduced solid-waste stream, current PURPA law and proposed changes, bidding guidelines, and technological advances.

Over the next decade, utilities will be scrambling to add generation as demand growth outpaces capacity increases, reducing reserves. At the same time, states, counties and municipalities will find landfill sites limited, while the need for such sites increases.

These would seem problems with complementary solutions, that is: burn the growing amounts of waste to provide needed additional generating capacity for utility use.

From an economic viewpoint alone, however, waste cannot yet compete with other fuels in most regions. But as the cost of waste disposal becomes greater, and as emission-control, trash-handling, plant operation, and disposal technologies advance, then the economic viability of waste-to-energy facilities seems sure to improve.

In some areas, though, regulators, governmental bodies and/or utilities now include substantial non-price incentives in their deliberations of waste-to-energy plants or when setting criteria for bidding guidelines.

These factors facilitate the use of such systems, and other refuse-reduction methods, in solving society's impending waste-management crisis.

Power sales from cogenerators, independent power producers, municipalities or counties may serve to introduce utilities to waste-to-energy facilities and their first waste-generated power.

As incentives for development increase, more utilities may consider direct involvement. Some recent activity includes:

- Northern States Power Co., prompted by state laws on waste-stream reduction, has undertaken a number of projects.
- Georgia Power Co., to help communi-

ties with long-range waste planning, published "A Guide to Solid Waste Disposal Options." Lyman Shivers, a GP marketing staff engineer, said there's a considerable amount of misinformation around. That's responsible, in part, for not-in-my-backyard siting problems, he said. GP is not yet involved in a project directly.

- The Greater Detroit Resource Recovery Authority is constructing the larg-

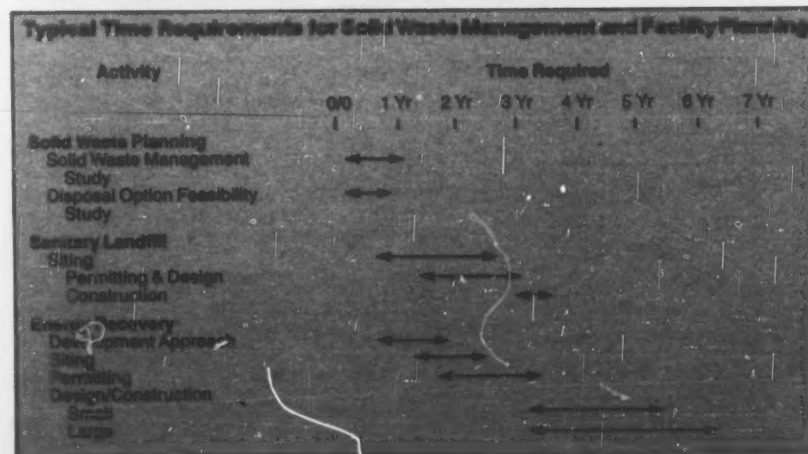
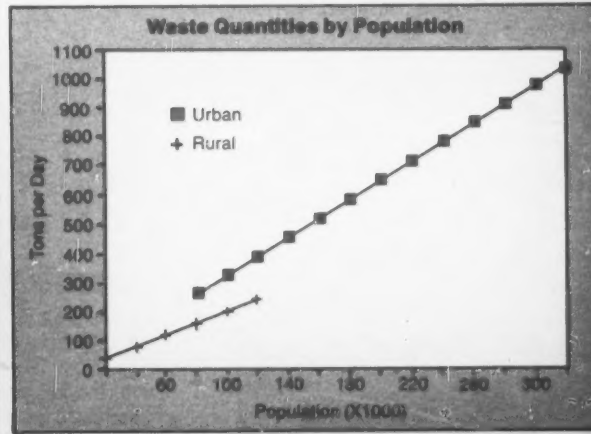
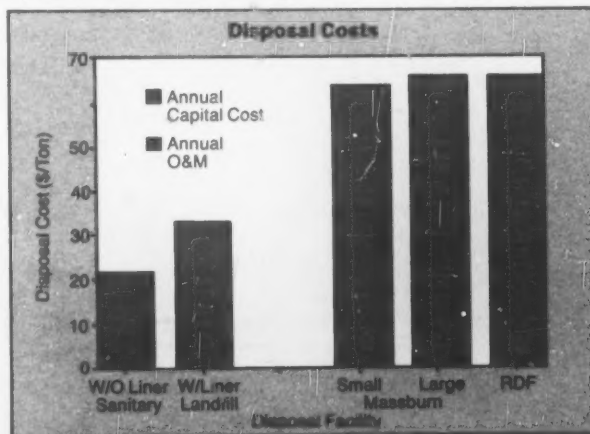
est U.S. waste-to-energy plant so far, a 3300-tons-per-day facility to be finished next year. It will generate steam for the downtown loop and sell up to 68 MW to Detroit Edison Co.

Other utilities are co-firing up to 15 percent refuse-derived fuel (RDF) with coal. These include, among others, Baltimore Gas & Electric Co., New England Electric System, United Illuminating and Madison Gas & Electric Co.

Specialty waste-burning plants around the country burn various types of commercial and industrial waste or process byproducts, including tires, coal mine tailings, wood chips and various agricultural waste.

Focus On Waste to Energy

More stringent air-emissions and ash-disposal legislation could challenge the pace of development. Nevertheless, increasingly pressing municipal waste-disposal requirements, limited landfill potential and utilities' long-term needs for additional non-utility power seem sure to stimulate consistent, long-term growth of waste-to-energy facilities.



Typical Composition of Solid Waste	
Material	Weight Range (%)
Paper Products	40-45
Yard Waste	12-15
Food Waste	12-15
Plastics	10
Rubber, Leather	2-5
Textiles	2-5
Metal/Aluminum	1-2
Perfume	0.7
Glass	0.11
Incineration	0.03

Source: A Guide to Solid Waste Disposal Options, Georgia Power Co.

Conversion lets coal-fired station take trash

Peter Schueler
Babcock & Wilcox

United Power Association (UPA) is converting its 50-MW, three-unit Elk River steam generating station to burn refuse-derived fuel (RDF). The new 31-MW station in Minnesota will be fueled from an off-site waste processing plant owned and operated by Northern States Power Co. The power plant was constructed in the early 1950s.

This conversion, and 11 other waste-to-energy plants, when completed, will handle half of Minnesota's municipal solid waste. This construction was encouraged by the state's 1980 Waste Management Act, and subsequent amendments. These require that a comprehensive waste-management plan accompany permit applications for new mixed municipal solid-waste landfills, to reduce landfill volume.

That mandate, and the resulting four-to-five-fold increase in tipping

fees, caused a major move towards waste-to-energy facilities.

The newly converted plant will burn up to 1050 tons of RDF per day. The installation is similar to those completed by NSP at its Red Wing and Wilmarth (MN) stations.

NSP has joined with UPA in this project and has built, and will operate, a separate RDF-preparation plant to process the fuel for Elk River. In such plants, most non-combustible items are separated, some for recycling. The remaining shredded fluff, mostly plastic and paper, is trucked to the RDF-burning plants.

One of the most challenging and critical elements of the project is conversion/modification of the three boilers to burn all types of RDF. Differences in fuel handling, combustion temperature, Btu output, and emissions necessitate such conversions.

Although design differences between coal plants and various waste-to-energy

plants vary across the industry, B&W's latest RDF technology illustrates the types of changes generally necessary.

Originally Elk River Units 1 and 2 were stoker coal-fired boilers designed to produce 120,000 pph steam, producing 12.5 MW each. These modifications are expected to yield 86,300 pph steam, about 8.2 MW each.

Additional furnace volume was needed to maximize RDF throughput. New stokers were located 10.5 ft below their original position, thus extending the original furnace height.

The new furnace extension is a membrane-wall-type construction with an RDF-designed, overfire air system built in. Even with the furnace enlargement, steam conditions have been reduced to a level consistent with RDF firing standards. Coal firing volumetric liberation rates—the measuring time available for fuel burn—were 16,330-22,300 Btu/cu ft/hr, but RDF firing liberation rates normally run around 14,550 Btu/cu ft/hr.

Focus On Waste to Energy

hr. For coal firing the exit gas temperature was 2000 F, but for RDF it is about 1600 F.

New primary and secondary superheaters are designed to minimize the corrosive effects of RDF firing. The original generating-bank gas baffles were modified to reduce gas velocities, erosion and plugging potentials, typically a problem in all W-to-E plants. To cut flue-gas velocity to about 30 ft/sec in the original economizer, 8 of 22 economizer sections were removed.

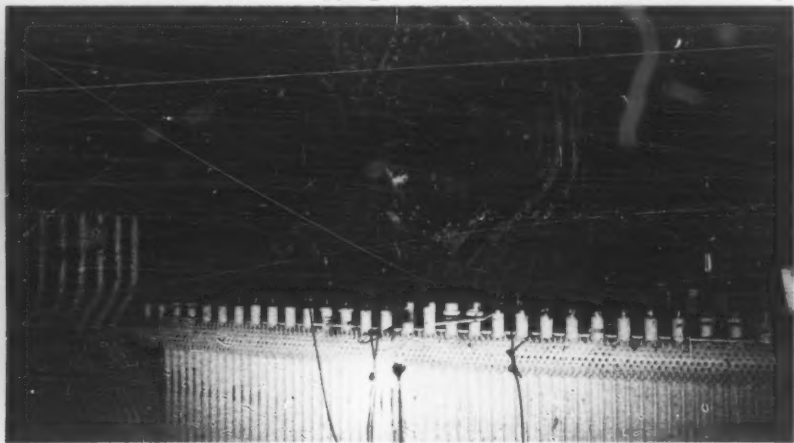
Unit 3 burned pulverized coal

Unit 3, originally a pulverized-coal-fired boiler, produced 215,000 pph steam at 875 psig and 905 F, producing 25 MW. Unit 3 is expected to produce 18.5 MW upon completion. Net plant output after redesign is an estimated 31 MW.

As with Units 1 and 2, the steam conditions have been reduced for RDF firing. A new lower furnace using membrane-wall construction replaced the original hopper bottom. The modified furnace is fitted with a new stoker and an overfire-air system similar to those on Units 1 and 2.

The boiler screen and arch were modified to accommodate a secondary superheater designed for RDF firing. Every other section of the existing primary superheater was removed to increase the clear-side spacing and reduce potential plugging. Retractable sootblowers were added to the secondary superheater cavity.

Continued on page 30



Waste-to-energy boilers can require more furnace volume than coal-fired boilers. In this conversion of a coal boiler, new stokers are 10.5 ft below their original position. The lower membrane wall meets the original upper furnace tube and tile. Note the original burner throats for auxiliary gas firing.

	Original Design	Modified RDF
Fuel	Coal	RDF
Steam Flow, bph	120,000	86,300
Steam Temperature, F	830	750
Steam Pressure, psig	815	815
Fuel Flow, tons/day	152.4	280
Excess Air, percent	30	70
Gross Generation, MW	125	82

	Original Design	Modified RDF
Fuel	Coal	RDF
Steam Flow, bph	215,000	173,600
Steam Temperature, F	905	750
Steam Pressure, psig	875	815
Fuel Flow, tons/day	265.2	585
Excess Air, percent	22	70
Gross Generation, MW	250	185

from page 28

Waste to energy...

while assuring proper operation of the air-pollution-control equipment.

Waste-to-energy technologies

Waste-to-energy technologies are divided into three broad categories: mass burn, refuse-derived fuel (RDF) and modular units.

Mass-burn plants receive mixed garbage from hauling vehicles (often after community recycling efforts have taken place). Garbage is typically dumped into a storage pit and deposited by crane into a feed hopper.

The garbage moves down a grate as it burns; combustion gases are generated, heating the furnace walls and boiler heat exchangers. Combustion gases then pass through air-pollution-control equipment before entering the atmosphere.

RDF plants differ in that refuse is first routed through a series of conveyors, shredders, screens and separators. Recyclable and noncombustible materials are removed in the process. The remaining material is a uniform fuel (mostly paper and plastic) with a higher heating value than mixed garbage. It can be burned in a dedicated plant or, with some plant modifications, co-fired with coal in some boilers.

Modular facilities are similar to mass-burn plants but smaller in size. As a result, modular units are usually shop fabricated.

Emerging disposal guidelines

Waste-to-energy plants generate two types of ash. Bottom ash is removed from beneath the combustion chamber and fly ash from the pollution-control

devices. They are typically mixed together and disposed of in sanitary landfills.

Disposal requirements for such materials are becoming increasingly stringent to ensure groundwater protection. Technical guidelines considered by 100th Congress and the EPA call for ash disposal in land facilities equipped with, at minimum, leachate collection and liner systems. The EPA recommends certain design standards and also specific operating controls, closure and post-closure requirements, groundwater monitoring, and corrective-action guidelines, as well as meeting any additional local standards.

Clear need, despite opposition

A recent EPA report points out that Americans are generating more garbage each year while available landfill capacity is diminishing. At the same time, other management alternatives are slow to meet increasing demand. For example, the EPA says just 10 percent of the waste stream is recycled.

Even if the U.S. is able to achieve a nationwide recycling level of 40 percent by 2000, about 75 percent of the waste stream (as measured in 1984) would remain, according to Walter Shaub, technical director of the Coalition on Resource Recovery and Environment (CORRE). And that assumes that 100 percent of the recycled waste will be reutilized, which is optimistic. These figures account for an annual increase in the garbage production rate of 1.3 percent starting in 1984.

No single approach will solve the growing garbage crisis. The key to an effective disposal system lies in developing an integrated waste-management program including waste reduction, re-

cycling, waste-to-energy plants, and landfilling.

Clearly, the need for waste-to-energy projects will continue to grow.

Industry groups: IRR and NSWMA

The largest group of private owners and operators in the waste-to-energy field today is comprised of independent vendors who are members of the Institute of Resource Recovery (IRR), a component of the National Solid Wastes Management Association. IRR members currently have a total 72 projects in operation, under construction or in the planning stage. These projects have a combined design capacity of more than 98,500 tons per day (TPD). In addition, IRR members own approximately 60 percent of the projects they are involved with, and operate almost all of them.

IRR's members include: American REF-FUEL Co., Blount Energy Resource Corp., Combustion Engineering Inc., General Electric Co., Ogden Martin Systems Inc., Riley Energy Systems Corp., Waste Management Energy Systems Inc., Westinghouse Electric Corp. and Wheelabrator Environmental Systems Inc.

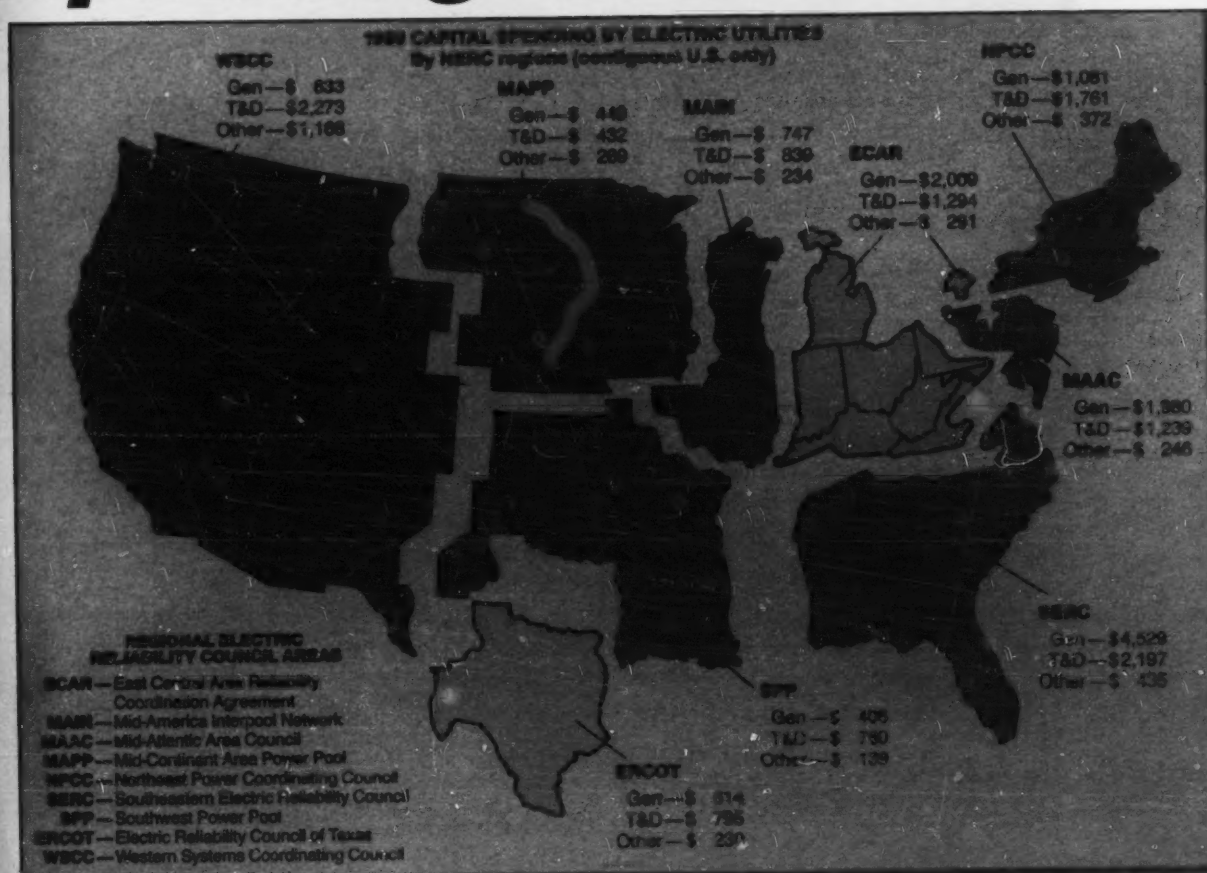
For more than 15 years, IRR has advocated waste-to-energy plants as an important part of waste-management strategies that also include waste reduction, recycling and landfilling. IRR members are waste-service firms specializing in recovering energy and materials from garbage while reducing its volume through combustion. NSWMA is some 2700 private, professional firms whose primary concern is the collection, transport, management and disposal of solid waste and refuse.

EL&P

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

'89-'93 construction spending to increase



BARRINGTON, IL—Spending by U.S. electric utility organizations for new plants and facilities will total \$128.7 billion over the five-year period 1989-1993. This reflects a 5.9-percent increase over spending for the five years 1988-1992 and suggests that the precipitous decline in construction activity is slowing and could bottom out by the end of 1991.

This is one of the major findings in *Electric Light & Power's* 1989 Capital Spending Survey, which was completed in November.

Spending for 1989 will be \$27.4 billion, the survey indicates. This will be about the same as last year's survey indicated would be spent in 1988 and is 11.4 percent higher than projected for 1989 a year ago.

See the full capital spending survey report beginning on page 17

Generation spending in 1989 will increase very slightly from a year ago, to \$12.4 billion from \$12.3 billion in 1988. Although the increase is small, it is the first upward movement in generation construction spending in more than five years.

Spending for substations and for transmission facilities will increase by \$376 million in 1989, to \$4.2 billion, an increase of 9.8 percent from a year ago. Distribution spending, however, is projected to decline 7.4 percent, to \$7.4 billion from projections of \$7.9 billion in 1988. Despite slipping from the 1988 level, 1989 distribution spending nevertheless will be above that of 1987, indicating the strength of residential and commercial construction activity.

SDG&E agrees to SCE merger

SAN DIEGO—San Diego Gas & Electric Co.'s board agreed to merge with SCE Corp. in a \$2.56-billion deal that would create the nation's largest utility. Shareholders will likely vote on the proposal by April. The utilities also filed joint merger applications with state and federal regulators.

Not everyone is happy over the prospects. San Diego-area communities are concerned about losing a corporate headquarters and jobs, and they are studying ways to stop the deal, including municipalization.

SDG&E broke merger plans with Tucson Electric Power Co. in November over a disagreement about how to block SCE Corp.'s efforts to stop that merger.

As previously reported (EL&P, Sept. '88, p. 1), merger benefits are expected to include: operational savings from contiguous service territories with diverse economic bases; resolved prudence issues on completed nuclear

LATE NEWS

Commonwealth Edison Co. accepted a 4.5%, \$480-million, rate-hike compromise that includes a four-year freeze, far less than the \$1.4 billion originally requested. Seabrook could test at low power Jan. 6, if owners show \$72 million are available for decommissioning, and meet other conditions. The NRC also approved restart of Boston Edison's Pilgrim. Pacific Gas & Electric Co.'s Diablo Canyon nuclear plant rate case was approved by the California PSC with incentives for operation over 58% capacity annually. Consumers Power Co. and Bechtel Power Corp. have resolved claims resulting from construction of CP's abandoned Midland nuclear plant and set up a jointly owned generating company for CP's Palisades nuclear plant.

PSCC steps up HTGR closing

DENVER—Public Service Co. of Colorado plans to accelerate discontinuing nuclear operations at its Fort St. Vrain Nuclear Generating Station (FSV) by July 1990 at the latest.

The decision is not expected to have a material financial effect on the company nor hamper continued development of high-temperature, gas-cooled reactor (HTGR) technology.

Senior Vice President of Nuclear Operation R.O. Williams said the decision was made because of the difficult economics of successfully operating the pioneer-technology plant beyond the fuel capacity currently loaded in the reactor core.

A prepared statement from General Atomics (GA), designer and builder of the generating station, explained that major difficulties have been associated with a water-lubricated bearing for the circulators that push helium gas through the reactor for cooling. The plant, near Platteville, CO, was shut-down last July and is expected to restart this month.

Despite the troubled life of the plant beginning during its construction stage, Williams stated, "We feel the basic fuel design and reactor technology used at Fort St. Vrain is extremely sound." Linden Blue, GA vice chairman, added that FSV has provided a unique demonstration, experience now being fully integrated into the current, smaller, modular HTGR designs.

building; well-balanced fuel mix and facilitated access to low-cost northwestern and southwestern power sources.

Especially advantageous to SDG&E ratepayers is the promise of a 10-percent residential-rate decrease to be filed within six months of the merger.

Not everyone in the San Diego area is willing to accept the touted benefits, explained Leslie J. Girard, deputy city attorney. Girard said that after a meeting among leaders of more than a dozen area communities, the city put up \$250,000 to study making the utility a public power organization. In addition, the County Water Authority is attempting to amend its charter to allow such a takeover.

Girard pointed out that some misinformation has been circulating and added that a majority of area media coverage on the issue has been negative.

Analysts at Moody's Investors Service Continued on page 14

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BPA and SoCalEd sign power sales agreement

The Bonneville Power Administration said it has signed a 20-year power sales and exchange contract with Southern California Edison Company. BPA expects the agreement to bring in a total of \$363 million by the year 2003, based on the present value of surplus firm power sales. After 2003, the contract may convert to an exchange of energy and capacity until 2008, according to BPA. "Under the terms of the agreement, the sale will convert to an exchange arrangement when BPA no longer has a surplus of firm power to sell," explained Bonneville Power Administrator Jim Jura. During the exchange periods, BPA would receive winter energy from SoCalEd in return for summer capacity. The contract is pending approval of both state and federal regulators.

Idaho Power, Seattle City Light trade power

According to Idaho Power Co., it has agreed to a seasonal exchange of electricity with Seattle City Light. Idaho Power said the five-year agreement is desirable since its peak demand time is during the summer and Seattle City Light requires more power in winter. Seattle City Light operates the Lucky Peak power plant which will provide Idaho Power's energy.

Illinois Power study shows need for Clinton

A study conducted by Illinois Power Co. found that the utility

would have experienced a critical shortfall in meeting customer needs for electricity this summer if the Clinton power station's generating capacity had not been available. "On at least 12 days, when we could not have purchased supplementary power from neighboring utilities, we would have been forced to curtail service to 88 major industrial customers," noted James E. McDonald, director of corporate communications for the utility. "In addition, power to 9 municipalities would have been interrupted on 6 of these 12 days," McDonald added. The study was submitted to the Illinois Commerce Commission.

Clinton station receives good ratings from NRC

Illinois Power Co.'s Clinton power station earned high ratings from the Nuclear Regulatory Commission in its annual Systematic Assessment of Licensee Performance, according to Illinois Power. NRC Regional Administrator A. Bert Davis described the company's performance as commendable during a demanding period of transition from testing to operation of the station. Clinton was evaluated from Sept. 1987 through Aug. 1988.

Atlantic Electric plans to build 75-MW turbine

Atlantic Electric plans to build a 75-MW combustion turbine on its property to help meet energy needs at peak demand times. The utility said it has already received initial approval for construction of the unit,

which is scheduled to go into service by the summer of 1990.

AEP opens Tokyo economic development office

American Electric Power Co. announced that it has opened an economic development office in Tokyo. AEP said it is one of the first major electric utilities in the United States to establish a full-time industrial recruitment program in Japan. AEP President and Chief Operating Officer Richard E. Disbrow said the company has hired the international management consulting firm of Deltapoint International, Ltd. of Tokyo to be its full-time representative in Japan.

PUC okays ALLTEL's CP National acquisition

The Oregon Public Utility Commission has approved ALLTEL Corp.'s acquisition of CP National Corp. According to the commission, the acquisition will not affect CP National's former electrical service area in northeastern Oregon, which has been sold to the Oregon Trail Electric Consumers' Cooperative (see EL&P September issue, p.2).

Engineering consulting firm formed to serve electric utility industry

A new engineering consulting firm, Commonwealth Associates Inc. (CAI), has been formed to provide professional services to the electric utility industry. CAI said its services

include transmission line engineering, substation engineering, distribution engineering, electrical system studies, surveying, right-of-way acquisition, construction management, route selection, and impact studies. Located in Jackson, MI, the employee-owned company is headed by Lester J. Walcott, president. Irwin O. Hasenwinkle and Robert J. Broad are vice presidents.

Broadhead is president and CEO of FPL Group

FPL Group Inc. has chosen James L. Broadhead as president and CEO, succeeding Marshall McDonald who retired Dec. 31. McDonald will serve as chairman of the company. Before taking on his position at FPL Group, Broadhead was president of GTE Corp.'s telephone operations.

Rogers selected as chairman, CEO of PSI

James E. Rogers, Jr. has been appointed chairman and CEO of Public Service Company of Indiana and head of PSI Holdings, Inc. Rogers, formerly executive vice president of Enron Corp., will replace the retiring Hugh A. Barker who will remain as director of the utility and PSI Holdings. Darrell V. Menser will continue to serve as president and chief operating officer of PSI.

IEEE appoints Bayless president-elect for '89

The Institute of Electrical and Electronics Engineers has named Carleton A. Bayless president-elect. Bayless, a telecommunications consultant, will serve as president-elect during 1989 and will become president on Jan. 1, 1990. George F. Abbott, director of special projects in telecommunications at North Carolina State University, was made executive vice president for 1989.

LADWP picks manager

Norman E. Nichols will serve as general manager and chief engineer of the Los Angeles Department of Water and Power, according to the city Board of Water and Power Commissioners. Nichols replaces Paul H. Lane who is retiring.

Hydro work wins NU consultant ASCE award

The American Society of Civil Engineers presented Antonio Ferreira with its first Phillip R. Hoffman Award, for distinguished contributions to the development of advanced hydroelectric technologies. Ferreira, a hydroelectric consultant for Northeast Utilities, was recognized as an industry leader in promoting pumped storage as an effective energy conversion technology. Ferreira was project manager during the design and construction

of NU's Northfield Mountain pumped storage hydro generating station and worked on research projects for the Electric Power Research Institute.

BG&E asks customers to be 'energy managers'

As part of a program to foster wise energy use and help reduce the load on its generating capacity during peak demand periods, Baltimore Gas and Electric Co. (BG&E) is recruiting residential electric customers to become 'energy managers'. BG&E said its multi-leveled Energy Manager Program offers time-of-use rates that price electricity more cheaply during certain off-peak times. Customers may also elect to have a radio-controlled switch installed which permits BG&E to cycle air conditioners and heat pumps off and on for short periods in order to regulate energy demand. Participating customers would receive a \$10-per-month reduction in their electric bills from June through September.

Electricity is safest fuel for homes, says study

Electricity is the safest fuel for residential energy use, according to a recent study conducted by Energy Research Group (ERG). In its study, ERG compared the risks of using gas, wood, coal, oil, kerosene, and electricity for residential energy needs. The research revealed that risk of fatality from wood and coal-fired systems is 15 times greater than from electricity, and gas-fired systems are nearly two and a half times more dangerous than electric systems. According to ERG, its findings were based on detailed calculations of the annual fatality and injury risks for three major residential energy end-uses: space heating, water heating and cooking.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:

- Boston Edison Co.**
A \$50,000 civil penalty for a security violation at the Pilgrim nuclear power plant.
- Commonwealth Edison Co.**
A \$150,000 fine for inadequate testing of electrical components at the Quad Cities nuclear plant.
- Consolidated Edison Co.**
A \$75,000 fine for alleged violation of equipment qualification requirements at Unit 2 of the Indian Point nuclear plant.
- Neb. Public Power District**
A \$150,000 fine for alleged violations of NRC requirements at the Cooper nuclear station.
- Philadelphia Electric Co.**
A \$50,000 fine for violations of security requirements at the Peach Bottom power station.
- Virginia Power**
A \$50,000 civil penalty for alleged violation of NRC requirements at the Surry nuclear power plant.

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COMMENTARY

1988: busy year of contrasts; 1989 offers new opportunities

Looking back, 1988 wasn't a bad year for the electric utility industry. As we move into the new year, it's a good time to pause a moment and take stock of just what actually took place during 1988 and what the year ahead portends:

Utilities suffered through ice storms last winter. Then they were hit with prolonged heat storms and one of the driest summers in history.

Demand jumped with summer temperatures. All-time high demands were recorded by many utilities on several occasions, only to be broken again a few weeks later. Yet, only two NERC areas suffered blackouts and brownouts.

Overall, utilities' earnings stabilized, even though they may not have increased much. But investor-owned companies' financial conditions generally are much stronger. Ambitious construction programs launched in the late 1970s and early 1980s were concluded. While earnings haven't exactly jumped, the elimination of Construction Work in Progress and Allowances for Funds Used During Construction means that cash, not just accountants' ink, is bolstering the quality of earnings, a long-overdue development that makes investors happy.

The Federal Energy Regulatory Commission announced plans to revise its PURPA regulations, establishing independent power producers as legitimate factors in the electric supply equation and encouraging competition between potential energy suppliers. Investor-owned utilities generally were cheered at the prospect of getting out from under having to buy high-cost cogenerators' power. But cooperatives and public power utilities immediately objected on the grounds that lack of transmission access effectively will restrict true competition and defeat FERC's goal. Fear of mandated open transmission access brought a new war cry from EEL and many investor-owned utilities.

A few leaders in co-op and public power organizations rattled sabers elsewhere during the year, apparently trying to renew the public vs. private power conflict of the '50s and '60s. But local organizations appear reluctant to answer the call. There really is room for all types of power suppliers in our economy.

On the nuclear front, NRC OK'd federal approval of utilities' emergency plans in the absence of state and local emergency planning, hopefully clearing the way for start up of both the Shoreham and Seabrook nuclear plants. But then NRC backed off and said that it wasn't pushing to speed licensed startup.

Beleagued Long Island Lighting Co. worked out a sweetheart deal with the state of New York, but at year end, was left high and dry by the state legislature, like a jilted bride waiting at the altar. Under the agreement, LILCO was to get a series of 5-percent rate increases and necessary future power supplies to meet demand in return for giving up Shoreham. Now, however, because investment-grade credit ratings are hampered by a law suit that could bankrupt the company, legislative support may not matter.

Merger mania commanded headlines, but when the clamor quieted and the dust settled, there weren't many unexpected changes, except for the San Diego Gas & Electric/Southern California Edison deal, and it hasn't been completed.

Elsewhere, a number of utilities trimmed workforce and several major suppliers entered agreements that further consolidated the largest manufacturers.

When you sort through all hoopla, and sift out the real achievements, it comes right down to the fact that the industry enjoyed a rather solid, normal good year. And that goes for most of its individual members, regardless of political persuasion. Oh, a few worrisome problems remain, but for most suppliers of electric service, '88 was a good year and it appears that '89 will continue the trend.

Time will tell, of course, but we would expect the movements that began in 1988 to continue in 1989. The impact of proposed PURPA revision remains to be seen, but if it shakes out as current development suggests, there will be more competition and more open, albeit not free, access to transmission facilities. Reregulation efforts will continue under the Bush Administration, but '89 progress will be slow. Diversification will continue, where opportunities present themselves. And operational efficiencies will improve. All of these will contribute to continued stability. And customers may find their rates remaining stable, or declining, in real terms, if not in current-year dollars.

Each passing year seems to be more interesting than its predecessor. 1989 would appear to be no exception.

We hope yours will be rewarding and successful...and personally fulfilling.

Robert A. Lincome, EL&P Editor-in-Chief

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Electricity bills decreased last winter, says NARUC survey

WASHINGTON—The national average electricity cost last winter was 8.04¢/kWh, a slight decrease from the past year's cost of 8.1¢/kWh for 500 kWh, said a survey by the National Association of Regulatory Utility Commissioners.

The 0.7-percent decrease was noted in NARUC's 1987-88 Winter Survey of Residential Electric Bills, despite a 4.4-percent jump in the Consumer Price Index (CPI) during the same period. The previous year, the price stayed the same, with a 2-percent CPI increase.

		Avg. Cost, Cents/ kWh, 500 kWh	
Rank	DOE Region	'87-'88	'88-'87
1	2 Northeast	10.5	10.4
2	9 Pacific	9.5	9.2
3	1 New England	9.4	9.1
4	7 Central Plain	8.0	8.2
5	3 Mid-Atlantic	8.0	8.2
6	5 Mid-West	7.9	7.9
7	8 Southwest	7.7	7.8
8	6 Rocky Mountain	7.3	7.2
9	4 Southern	7.2	7.4
10	10 Northwest	5.2	5.1
National Average		8.04	8.1

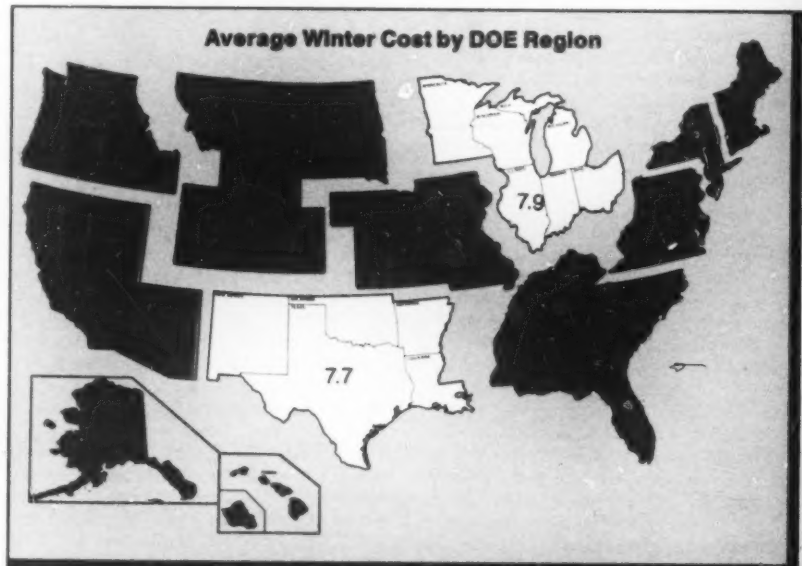
NARUC 1987-88 Winter Survey Of Residential Electric Bills

Although it was the first decrease in the 10-year history of the survey, both ends of the scale increased slightly over last year and differ about 300 percent. Costs ranged from a low of 4.2¢/kWh for Washington Water Power Co. customers in Lewiston, ID, to 13.5¢/kWh for Consolidated Edison Co. customers in New York, NY. That's up from 4.0¢/kWh and 13.1¢/kWh, respectively.

The study shows 10 service territories where consumers pay more than 11¢/kWh and 21 service areas where consumers pay less than 6¢/kWh.

The Northeast was most expensive and Northwest the least. Actual costs depend on usage level and state taxes.

The survey covers 195 service areas of major investor-owned regulated electric utilities in 49 states and the District of Columbia; unregulated Nebraska has none. The bills for residential electric service for December, January and February were reported to NARUC for four different levels of energy consumption: 250, 500, 750 and 1000 kWh.



Twelve Most Expensive Service Territories

Company	State	Avg. Cost Cents 500 kWh	Winter '87-'88 Rank
Consolidated Edison Co. of N.Y.	New York	\$0.135	1
Kauai Electric Co.	Hawaii	\$0.127	2
Long Island Lighting Co.	New York	\$0.124	3
Nantucket Electric Company	Massachusetts	\$0.119	4
San Diego Gas & Electric Co.	California	\$0.118	5
Hawaii Electric Light Co.	Hawaii	\$0.118	6
Philadelphia Electric Co.	Pennsylvania	\$0.116	7
Boston Edison	Massachusetts	\$0.114	8
Maui Electric Co.	Hawaii	\$0.113	9
Orange & Rockland Utilities Inc.	New York	\$0.112	10
United Illuminating Co.	Connecticut	\$0.109	11
Atlantic City Electric Co.	New Jersey	\$0.109	12

Twelve Least Expensive Service Territories

Company	State	Avg. Cost Cents 500 kWh	Winter '87-'88 Rank
Washington Water Power Co.	Idaho	\$0.042	126
Washington Water Power Co.	Washington	\$0.043	124
CP National Corp.	Oregon	\$0.044	123
Naho Power Co.	Idaho	\$0.044	122
Pacific Power & Light Company	Washington	\$0.044	121
Kentucky Utilities Co.	Kentucky	\$0.047	120
Idaho Power Co.	Oregon	\$0.048	119
Puget Sound Power & Light Co.	Washington	\$0.049	118
Berea College	Kentucky	\$0.050	117
Potomac Electric Power Co.	DC	\$0.051	116
Portland General Elec. Co.	Oregon	\$0.051	115
Citizens Utilities Co.	Vermont	\$0.055	114

Source: NARUC 1987-1988 Winter Survey of Residential Electric Bills

Incentive compensation comes of age

BARRINGTON, IL—Emphasis on annual cash incentive bonuses for electric utility executives increased during the period from 1982 through 1987. In fact, more than 70 percent of investor-owned electric utility companies that had such incentive programs in place at the end of 1987 adopted them during that period.

Moreover, to paraphrase Olympic gold medal gymnast Mary Lou Retton during a Wheaties commercial a few years back, "Annual bonus programs ain't just for the big boys." Indeed, 64 percent of investor-owned utilities with annual revenues between \$250-\$500 million have such programs.

form Act has had a stronger impact on executive compensation than any other recent piece of legislation. "While the Act does not eliminate the appeal of capital appreciation, such appreciation is now taxed at the same rate as ordinary income. This removes some incentive for owning real shares of one's company stock...and strengthens the attractiveness of such incentives as phantom shares and stock appreciation rights, means by which executives can benefit from increases in the value of their company's shares without actually owning shares." Overall, he said, "the act strengthens the use of cash as the principal medium of executive com-

pensation, whether such award is for short- or long-term performance."

He went on to say that the current maximum tax rate of 33 percent has taken the luster off income deferral. In terms of its impact on pensions and retirement programs, he said the study points out the fact that Section 415 of the Tax Code, as modified by the Act, has forced electric utilities to develop alternative means of rewarding their executives. This has meant developing a range of supplemental plans to counter the limitations of the Code.

Key officer compensation

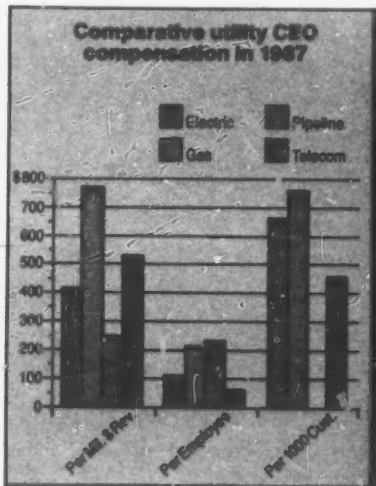
In response to the question of how

electric utility executives are compensated in comparison with executives of other types of utilities, the answer is, on balance, not too badly. Measuring compensation against various indices of company size (revenues, number of employees and number of customers), the average electric utility CEO did reasonably well, although not as well as his counterpart in the gas industry.

Recent salary increases

The study revealed that the average investor-owned utility executive saw his 1987 cash compensation increase 15.5 percent, while the average for all

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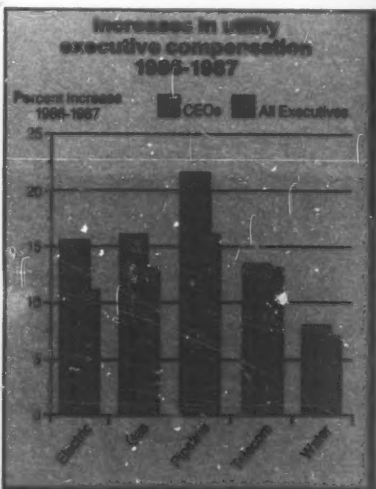


These are just two of the highlights of a recently published comprehensive study of compensation practices of 251 investor-owned utilities conducted by the Washington, DC-based Utilities Consulting Group. Of the companies studied, 136 were electric or combination electric and gas utilities. Gas distributors accounted for 53 and the balance represented telecommunications, water and pipeline companies. The electric companies surveyed represent virtually all the investor-owned electric utilities with 1987 revenues in excess of \$25 million. Included were eight large holding companies with two or more operating subsidiaries, 22 subsidiary operating companies, 57 independent electric utilities and 49 independent combination electric and gas utilities.

The report provides a database consisting of separate company analyses and shows cash compensation for up to 10 officers, as well as incentive, deferred and retirement compensation programs for each company.

Impact of the 1986 Tax Reform Act

According to David Marder, president of Utility Consulting Group and author of the study report, the 1986 Tax Re-



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utility industry officers was 11.8 percent. These figures track favorably with a recent national survey of U.S. executive compensation, which found that in 1987 the average CEO in industry saw an increase in cash compensation of 11.5 percent.

CEOs highest

Among the five categories of utility business, pipeline company CEOs received the highest increases (22 percent), while CEOs of water companies received the smallest increases (8 percent). For other officers included in the study, those working for pipeline companies enjoyed the greatest '87 gain (16.5 percent), while water company officers received the least (7 percent).

Between 1982 and 1987, the median electric utility CEO realized an increase

of 53 percent in cash compensation, while a gas utility CEO received a 45 percent gain. For all officers of investor-owned electric utilities, the average increase was just under 39 percent. The study examined the level of increase over the five-year period for each of 17 officer positions and found that cash compensation of the principal legal officer increased the most, 72 percent, while the gain for the principal regulatory officer, 21 percent, was the lowest.

Incentive compensation

The use of cash award, short-term incentive compensation is not just the province of larger electric utilities. Fourteen of 22 smaller companies in the sample, with '87 revenues between \$250-500 million, also make use of such incentives.

Electric utilities with short-term incentive compensation plans

Util. Rev. size	# in sample	% with plans
\$5 B and up	5	60
\$2-4,999 B	18	55
\$1-1,999 B	24	46
\$500-999 M	25	44
\$250-499 M	22	64
\$100-249 M	9	33
Under \$100 M	11	0
Total	114	46

The study describes each of the incentive programs for the 52 companies reporting them, detailing the year in

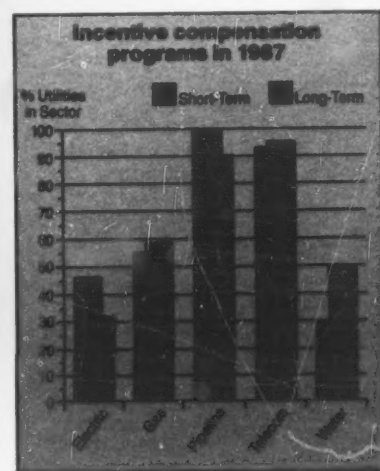
which the programs were started, the criteria employed to determine whether awards will be made, the maximum percentage of salary that an individual award can represent, the percentage of total compensation that 1987 awards represented and the categories of executives included in the award group.

The report stated that long-term incentive compensation programs have become less important in overall executive compensation programs. This, it says, is the result of "ever-increasing emphasis on current performance throughout American business, especially among stock-exchange listed companies." The report goes on to discuss the specific implications of the 1986 Tax Reform Act on long-term incentives and describes the use of phantom stock, stock appreciation rights and other stock-related awards in this area. It reviews the practices of the one-in-three utilities that reported having such long-term programs in force in 1987.

Golden parachutes

Marder points out in the study that "The utility industry may well become no different from others when it comes to mergers, buyouts and the prospect of unwanted takeovers. As a result, even in the asset-intense electric utility industry, senior officers are asking for and gaining agreements to protect their incomes and pensions in the event of termination following change of control of the company."

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The study showed 16 investor-owned electric utilities with such agreements with senior executives in force at the end of 1987. These companies ranged in size from \$57 million in '87 revenues (Upper Peninsula Power) to one with '87 revenues of \$4.35 billion (Florida Power & Light Co.), which is itself a subsidiary of FPL Group. The report further indicated that among these companies, the "three-times" rule generally applies (the covered executives are guaranteed three times their salaries or, in some cases, salaries plus bonuses) if terminated as a result of change of control of the utility. In a few cases, the rule also applies if executives leave voluntarily as a result of such change of control.

Deferred, retirement compensation

A specific fallout of the Tax Reform Act of 1986, the study explains, is the negative impact on the attractiveness of 401(k) retirement plans for highly paid executives. "Previously," the report says, "an executive could defer a portion of annual salary up to \$30,000 to his 401(k) account. With a change to a more egalitarian approach in the Code and a corresponding drop in the maximum amount of tax-free deferral from \$30,000 to \$7,000, the 401(k) is a far less attractive executive compensation element."

Nonetheless, the study shows that about 54 percent of investor-owned

Continued on page 8

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Executives consider increased diversification worth the risk

CLEVELAND, OH—More than 75 percent of utility executives—but only 42 percent of state commissioners—believe that the potential advantages of diversification outweigh potential risks and disadvantages, said a recent survey of utility executives and state commissioners by Price Waterhouse.

Diversifying helped

Just half of the commissioners said diversifying has helped utilities financial situations, while 65 percent of executives thought so.

Most utilities said diversification accounted for less than 1 percent of earnings, but more than 64 percent of both utilities and regulators predicted diversification activities would increase.

Trends and attitudes

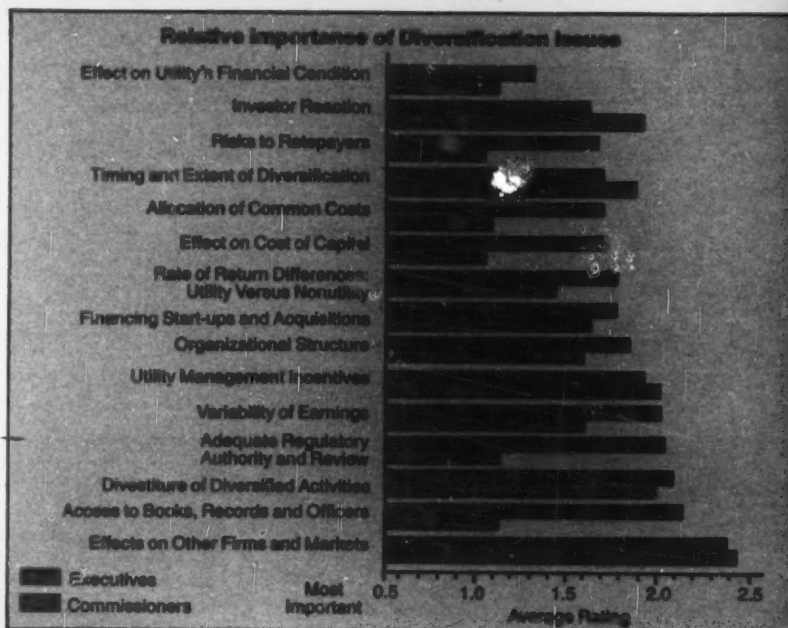
Although the survey covers trends and attitudes on diversification, it only includes responses from 27 utilities

and 15 commissioners and so may not be representative of all 207 investor-owned utilities and all regulators.

Key findings

Some of the key findings were that:

- The opportunity to increase earnings was most frequently mentioned by both groups as the prime reason to diversify.
- Lack of knowledge about nonutility businesses and the inability to compete successfully in unregulated businesses were two most frequently mentioned risks by utilities. The fear of increasing overall risk was cited as most dangerous by commissioners.
- Energy-related ventures were seen as most appropriate.
- The three utilities most cited as having the most extensive diversification programs were: FPL Group Inc., PacifiCorp and Florida Progress Corp.
- The most important issues related to diversification included: effect on finances, investor reaction, ratepayer risk, common cost allocation, effect on cost of capital and adequate regulatory authority and review.



N-plants operated more safely post-'84

WASHINGTON—U.S. utilities have operated their nuclear power plants more safely since 1984, suggested a recent Nuclear Regulatory Commission staff report.

Key indicators

A number of key performance indicators, averaged industry-wide, showed improvement over three years:

- "Significant events" dropped from an average of 2.4 events per reactor in 1985 to 1.6 in 1986 to 0.8 in 1987.
- Average number of unplanned automatic reactor "trips" per year decreased from 5.2 in 1984 to 3.2 in 1987.
- Average number of challenges to the emergency core cooling systems and emergency diesel generators decreased from 2.8 in 1984 to 1.7 in 1987.
- Average radiation exposure to workers at nuclear power plants decreased from 714 man-rem per reactor in 1984 to 425 man-rem per reactor in 1987.
- The number of plant shutdowns required by individual plant technical specifications remained low.
- The number of events determined by the staff to be significant from a risk standpoint also declined, from 17 in 1984 to six in 1986.

Three years = 30.8 GW N-capacity

From 1984 to 1987, 28 nuclear power plants, generating 30,800 MW, received operating licenses. In 1987, five new units were licensed for low-power testing and eight were licensed for full-power operation. At the end of 1987, licensed reactors numbered 109.

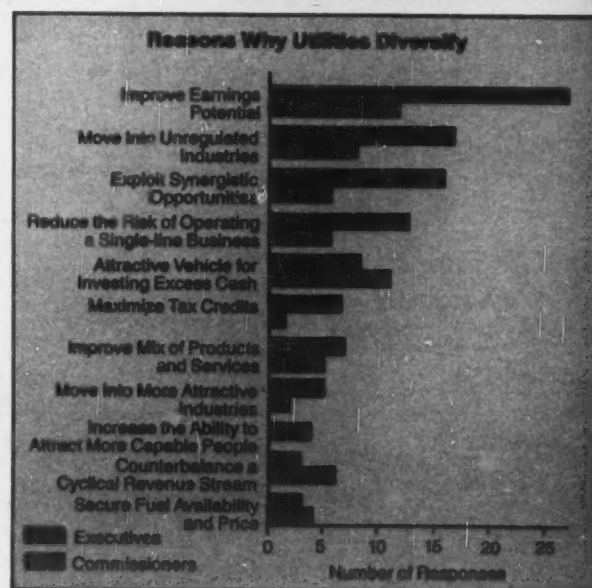
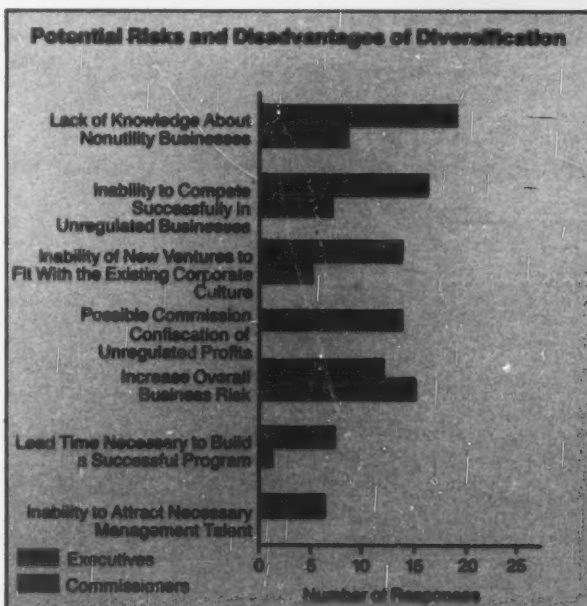
Areas for plant-specific improvements for safety and plant performance include air systems, decay heat removal, motor-operated valves and human performance.

Other staff studies have shown that human factors involving deficient procedure, deviation from procedures, lack of adequate procedure or inadequate training continue to be the cause of many problems.

For copies

The two-volume "Report to the U.S. Nuclear Regulatory Commission on Analysis and Evaluation of Operational Data—1987" was prepared by the NRC's Office of Analysis and Evaluation of Operational Data. That office was created after the 1979 Three Mile Island accident.

The report is available from the Government Printing Office, P.O. Box 37082, Washington, DC, 20013-7082, telephone, 202/275-2060.



Source: Diversification: Electric Utility and Regulatory Perspectives, Price Waterhouse

National quality awards to two industry suppliers

WASHINGTON, DC—Two leading industry suppliers—the Commercial Nuclear Fuel division of Westinghouse Electric Corp. and Motorola Inc.—have earned the first Malcolm Baldrige National Quality Awards in ceremonies here. The awards were presented by President Reagan.

The award, for demonstrated excellence in the quest for product quality, was named after former Secretary of Commerce Malcolm Baldrige, and was established by Congressional legislation passed in 1987. Its purpose is to promote national awareness of the importance of improving quality in products and services in order to improve the global competitiveness of U.S. companies, and to recognize quality achievements toward those ends by U.S. companies.

Commerce Secretary C. William Verity said the companies serve as "inspiring examples of what can be accomplished...in improving quality, strength and market position."

Westinghouse Chairman and CEO John C. Marous called the company's nuclear business the public's business. "I hope that this recognition of our...devotion to quality improvement will reflect credit on the entire industry, which is so important to the economic well being of the entire nation. That's what the Malcolm Baldrige Awards are

all about...helping American companies become world class."

He declared that quality is the key to the company's growth and to its success as a business.

Speaking for Motorola, Robert W. Galvin, chairman, described the company's driving thrust as renewal. He recounted how Motorola aimed for total customer satisfaction and elevated its quality standards. He also declared that the company still realizes that "there is more to do." He also predicted virtual product perfection by 1992.

A third award was presented to Globe

Metallurgical, a small specialty metals firm in Ohio.

Secretary Verity presented a special distinguished public service award to John J. Hudiburg, chairman and CEO of Florida Power & Light Co., for his personal efforts in developing and bringing the nation's first award system for corporate excellence, the Malcolm Baldrige Award, to fruition.

Selection of the winners followed a comprehensive evaluation process by an independent board of examiners composed of private sector authorities on quality measurement.

from page 7

Incentive compensation...

electric utilities have deferred compensation programs for executives.

In the area of retirement compensation, the study revealed that, with few exceptions, all investor-owned utilities have non-contributory, defined benefit pension plans for employees. Section 415 of the Tax Code states that in the use of such plans, the highest annual benefit payable under the plan must not exceed the lesser of (a) 100 percent of a participant's average compensation in the highest three consecutive years of employment or (b) \$94,023 (the inflation-indexed amount in 1988).

This restriction effectively limits the use solely of a standard all-employee pension plan to cover the retiree... compensation of more highly paid executives. Therefore, a number of supplemental plans have been instituted. Approximately 86 percent of electric utilities report the use of such supplemental plans.

The complete bound report, *Executive Compensation Among Utilities: 1988*, is available from the Utilities Consulting Group, 4801 Massachusetts Ave. NW, Washington, DC 20016. The price is \$1,795.

Construction spending to increase; generation activity to pick up

Gas and oil favored for new generating units, T&D spending to continue at healthy level

Robert A. Lincome
Editor-in-Chief

The electric utility industry is stepping up its construction activities, continuing the turnaround and upswing begun a year ago. Spending in 1989 will be above that predicted a year ago and construction plans for the five-year period ending with 1993 will increase almost 6 percent, compared with the five-year period ending in 1992, as projected in the January 1988 issue of *EL&P*.

Moreover, capital spending for new and upgraded generating facilities in 1989 will grow over 1988, albeit by only a small amount, finally reversing the downward trend of the last decade.

These are some of the more important conclusions from *EL&P*'s 1989 survey of electric utility capital spending plans, which was completed in late November.

The survey covers utilities of all types—investor-owned, cooperative, federal, municipal and other publicly owned electric service organizations. Results are projected to represent the full industry.

'89 spending could equal '88

Total 1989 capital spending is projected to be \$27.4 billion, marginally less than was projected to be spent in 1988, but about 11 percent higher than was predicted for 1989 in last year's forecast report.

The increase reflects relatively steady capital spending programs in most NERC areas, with only small increases and decreases from last year for most NERC areas. The exceptions were the Northeast Power Coordinating Council, whose construction activity is projected to increase by more than \$1.4 billion, and the Western Systems Coordinating Council, for which spending plans appear to be off by an even greater \$1.8 billion.

In 1989, generation spending, as suggested above, will increase about 0.8 percent, to \$12.4 billion from \$12.3 billion in 1988. However, the amount projected to be spent this year is almost 16-percent greater than was projected for 1989 in last year's forecast.

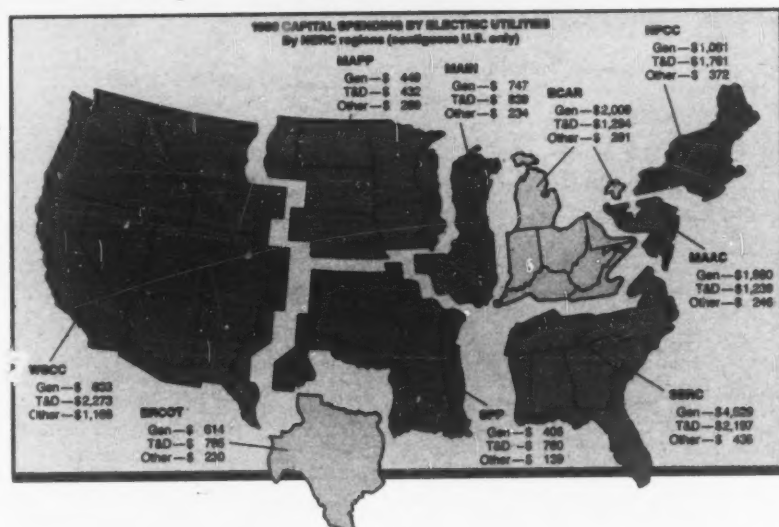
Transmission & distribution spending in 1989 should total \$11.6 billion, down about 5.2 percent from 1988 projections, but up about 7.6 percent from last year's estimates of 1989 T&D spending.

Other spending in 1989 should increase about 3.0 percent.

Five-year projections

Overall, electric utilities will spend \$128.7 billion in the five years 1989-1993. This represents a 5.9-percent increase from the five-year spending total projected in January 1988, and continues the turnaround trend begun a year ago.

Generation continues to be the largest single category of capital spending and, compared to other spending plans, shows a small increase in relative share of each capital dollar spent for the entire five-year period. Although spending for generation facilities will represent a smaller share of capital investment in 1990, 1991 and 1992, by 1993 generation spending will be just over 46 percent of total construction spending, the highest share since 1986. Also, in those three intermediate years, the per-



centage that will be devoted to generation system expansion, though below total T&D spending, will increase compared with the generation spending plans for those three years given in the 1988 forecast.

Combined spending for transmission and distribution facilities, including substations, will receive a larger portion of each capital dollar spent—averaging 46.9 percent—in 1990, 1991 and 1992. For the five-year period, U.S. utilities will spend some \$58.1 billion for T&D facilities, 7.6 percent more than will be spent for generation facilities in the same period.

Spending in "Other" categories of capital investment will increase about \$1.5 billion over the current five-year period—to \$16.6 billion—from \$15.2 billion projected for the period 1988-1992. The amount to be spent will run between 12.3 to 13.8 percent of total capital spending until 1993, when it will fall to under 11 percent.

Generation construction to grow

The 1989 study indicates that respondents will invest some \$54.0 billion for generation system expansion in the five years 1989-1993. This represents an increase of almost \$5 billion

from last year's forecast for the five years 1988-1992. The increase is about 10 percent.

Spending for generation, \$12.4 billion in 1989, will decrease in the next two years before turning upward in 1992 and 1993.

With an industry reserve in excess of 22 percent over summer peak demand, it is not unusual that respondent utilities showed a sharp movement away from baseload steam capacity for their "next" units. In fact, four NERC regions reported no plans for adding baseload steam units next. ECAR, MAAC and SPP each reported plans to add two baseload steam units next. Both ERCOT and MAPP indicated plans to add one baseload steam unit next.

The majority of "next" units to be added will be either combustion turbines (39) or combined cycle units. Interestingly, 14 other types of generating units were mentioned as "next" units, nearly double the number of baseload steam units.

While spending figures have been projected to reflect total industry capital investment levels during the next five years, plans for new capacity reflect only the actual responses from reporting utilities.

5-year T&D spending to grow

Transmission and distribution expansion plans indicate an increase of about 1.0 percent in construction activity during the 1989-1993 period. Five-year spending projections indicate a total of \$58.1 billion will be spent, compared with 57.5 billion in the five-year period ending in 1992.

Substation spending figures remain fairly constant for the period, running between a high of \$1.7 billion in 1989 to a low of \$1.5 billion in 1992, averaging about \$1.6 billion per year. Substation investment is understated since a number of utilities reported that they include substations in either transmission, distribution or in both categories of activity. Conversely, both transmission and distribution investment are somewhat overstated.

Transmission, projected at \$12.3 billion, reflects a slight decline in activity over the next five years. Despite announced plans to avail themselves of abundant Canadian power, which involves building substantial new transmission capacity, utilities generally plan to spend about 7-percent less for transmission than reported a year ago.

Distribution construction activity appears to remain strong through the five-year period, although the rate of increase is small. The industry plans to invest about \$38.1 billion for new distribution facilities over the five-year period, which is about 1.0 percent more than was projected in last year's survey.

Distribution construction spending should increase through the first four years of the period, but will fall off substantially in the last year of the period, according to responses. However, it was not possible to determine if this was a significant shift in investment or just the result of the shorter leadtime nature of distribution spending affecting the fifth year in the forecasting cycle.

Capital spending in the "other" category also is expected to grow during the 1989-1993 period over projections for the 1988-1992 period. Whereas capital spending in this classification averaged about \$3.0 billion for each of the five years in last year's forecast, the average for this year's forecast is \$3.3 billion, a

Continued on page 18

NERC Region	East Central Area Reliability Coordination Area
ECAR	Electric Reliability Council of Texas
ERCOT	Electric Reliability Council of Texas
MAAC	Mid-Atlantic Area Council
MAIN	Mid-America Interpool Network
MAPP	Mid-Continent Area Power Pool
NPCC	Northeast Power Coordinating Council
SEEC	Southeastern Electric Reliability Council
SPP	Southwest Power Pool
WSCC	Western Systems Coordinating Council

Region	Generation	Substation	Transmission	Distribution	Other	Total
ECAR	2,009	152	270	872	291	3,594
ERCOT	614	15	259	521	230	1,639
MAAC	1,980	39	140	1,060	246	3,465
MAIN	747	64	175	600	234	1,820
MAPP	449	43	95	188	269	1,150
NPCC	1,081	297	530	934	372	3,214
SEEC	4,529	287	611	1,290	435	7,161
SPP	406	192	107	461	139	1,305
WSCC	633	578	34	1,350	1,168	4,074
Total	12,448	1,673	2,532	7,385	3,384	27,422

Category	1988	1989	1990	1991	1992
Generation	45.4%	39.9%	38.4%	39.8%	46.1%
T&D	42.3%	46.4%	47.8%	46.0%	43.0%
Other	12.3%	13.7%	13.8%	13.6%	10.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%

PROJECTED 5-YEAR CAPITAL EXPENDITURES (By Region - in millions of \$)						
Region	1989	1990	1991	1992	1993	5-Year total
ECAR	\$ 3,594	\$ 3,505	\$ 3,314	\$ 2,955	\$ 2,705	\$ 16,073
ERCOT	1,639	1,412	1,378	1,599	2,355	8,383
MAAC	3,465	3,192	2,926	3,000	2,565	15,148
MAIN	1,820	1,860	1,856	1,633	708	7,897
MAPP	1,150	1,252	1,279	1,040	1,071	5,792
NPCC	3,214	2,828	2,619	2,702	2,659	13,822
SERC	7,161	5,986	6,218	7,255	8,350	34,970
SPP	1,305	1,373	1,368	1,440	1,629	7,115
WSCC	4,674	3,921	4,195	4,436	3,082	19,708
Total	\$27,422	\$25,148	\$24,953	\$26,061	\$25,124	\$128,708

PROJECTED 5-YEAR CAPITAL EXPENDITURES (By Function - in millions of \$)						
Function	1989	1990	1991	1992	1993	5-Year total
Generation	\$ 12,448	\$ 10,026	\$ 9,573	\$ 10,380	\$ 11,570	\$ 53,997
Substations	1,673	1,521	1,562	1,475	1,565	7,796
Transmission	2,532	2,410	2,579	2,516	2,217	12,254
Distribution	7,385	7,728	7,783	8,141	7,028	38,065
Other	3,384	3,463	3,456	3,548	2,745	16,596
Total	\$27,422	\$25,148	\$24,953	\$26,060	\$25,125	\$128,708

10-percent increase.

As mentioned in last year's report, earlier capital forecasts reflected substantial "other" spending for headquarters and other general-use buildings, certain capitalized fuel resources and the like; present "other" spending includes investment in facilities and resources involved in utilities' diversification programs as well.

Next capacity planned

Fifteen utilities will bring their next generating unit on-line by the end of 1991. A similar number, 15, said that they will bring their next unit on-line after the year 2000. Forty-three utilities will bring their next units on line between 1991 and 2000.

The year of greatest activity will be 1995, when nine utilities will put their next units into service. 1993 ranks as the second most active year, with eight next units going into service. Seven utilities will bring their next units on-line in 1990 and 1997.

As shown in the adjacent table, 15 utilities will bring their next units on-line in the 1989-1991 period, 13 in the 1992-94 period, 20 in 1995-97 and 10 in the 1998-2000 period. Fifteen utilities will not commission their next unit until after 2000.

Respondents told *EL&P* that they are planning few large units for the next to be built. Fifty-three units will be under 250 MW in size and only 16 will be 250 MW or larger. Only seven units planned as the next unit for respondent utilities will exceed 500 MW.

Interest in small-size units results from a combination of generally healthy reserve generating margins, relatively low demand-growth rates and the demonstrated reluctance of regulatory commissions to allow utilities to add unnecessary capacity into the rate base. Also, a number of utilities are confident of maintaining sufficient baseload capacity levels through the use of purchased power, and therefore are looking only to add peaking or cycling unit, either in simple cycle configurations or in combined cycle schemes.

Combustion turbines favored

As mentioned above, primary interest for the next unit to be added to respondent systems is combustion turbines, which offer short lead times, small incremental sizes, and low capital costs, but high operating costs.

According to survey responses, 39

utilities will commission combustion turbines as their next unit to go into service, more than 50 percent of all units reported. The second largest category is combined cycle units, which number 11 in the survey. Eight utilities reported that their next unit will be baseload steam capacity and four utilities' next units will be hydro. No further breakdown of these hydro units was requested so it is impossible to say what combination of low-head run-of-river or pumped-storage units will result. Fourteen utilities reported that their next unit will be something other than the previously given categories, including waste-to-energy, wood-burning and other unspecified types.

Natural gas preferred

As might be expected from the breakdown of unit types, fuel preference heavily favors natural gas. Forty utilities report that they will use natural gas to fuel their next unit. An additional 20 utilities have selected oil as their preferred fuel. Only 13 utilities will employ coal for their next unit. Other esoteric or non-conventional fuels were specified by three utilities, hydro by two and nuclear by one. The nuclear plant currently is under construction.

Life extension efforts increase

Utilities were asked what they were doing to improve operation of existing units. Life extension was by far the biggest activity, being reported by 46 utilities.

The second most active area of plant improvement was uprating work. Twenty utilities responding to *EL&P* said they were engaged in uprating one or more units.

Seventeen utilities replied that they have initiated modernization programs to bring older units up to newer performance standards. These may or may not increase unit life expectancy.

Fourteen utilities reported "other" improvement programs, including stricter maintenance scheduling.

Regional spending projections

In the next five years, capital spending for system expansion will tend to mirror the pattern of regional population and business growth. As has been true in the recent past, the area of greatest activity will be the SERC region, followed by the WSCC area. This continues the reversal reported last year, with the WSCC projecting another

large decline in capital investment for the current 5-year period and a large increase for SERC. SERC's 5-year spending should climb \$1 billion, while WSCC's 5-year spending will fall by almost \$5 billion.

Following are figures for regional spending for the period 1989-1993. Amounts are in millions of dollars.

ECAR			
	Gen	T&D	Other
1989	2,009	1,294	291
1990	1,802	1,360	342
1991	1,570	1,441	304
1992	1,221	1,384	350
1993	1,315	1,218	171
Total	9,926	6,697	1,458

Utilities in the East Central Area Reliability Coordinating group will spend just over \$16 billion for new system facilities in the period 1989-1993. During this period, three utilities report that they will bring new units into service. Generation spending will decline through 1992, then increase by nearly \$1 billion in 1993. Transmission and distribution spending will average about \$1.3 billion per year through the period, actually peaking in 1991. Spending for other activities will average under \$0.3 billion per year.

Ten utilities are engaged in life extension activities, double all other improvement programs. Uprating and modernization are being pursued by two utilities each, with three miscellaneous programs also mentioned.

ERCOT			
	Gen	T&D	Other
1989	614	795	230
1990	371	842	199
1991	396	726	256
1992	517	772	311
1993	1,169	915	271
Total	3,067	4,050	1,267

	'89-'91	'92-'94	'95-'97	'98-'00	Beyond 2000
ECAR	3	0	4	3	1
ERCOT	0	0	1	1	0
MAAC	5	1	0	0	2
MAIN	0	3	4	2	2
MAPP	2	1	2	1	2
NPCC	2	2	3	2	4
SERC	1	3	3	0	0
SPP	1	0	1	1	2
WSCC	1	3	2	0	2

	<100 MW	100-249 MW	250-499 MW	>500 MW
ECAR	5	5	1	2
ERCOT	0	1	0	1
MAAC	2	2	2	1
MAIN	7	1	0	1
MAPP	6	2	0	0
NPCC	2	1	5	0
SERC	2	4	1	1
SPP	4	2	0	1
WSCC	3	4	0	0

Texas utilities will spend almost \$8.4 billion for new facilities and equipment during the next five years. This reflects an increase of almost \$1.9 billion, or 27 percent over the five year period ending in 1992 and reported last year. However, a rather poor response rate from Texas utilities reduces the confidence level of ERCOT projections.

The heaviest total spending will occur in 1993. Projections of survey results suggest that after this year there will be little new generation expansion activity until 1993, when spending will increase to almost 2.5 times the average spending for the previous four years. T&D expansion spending, which will total \$4 billion for the period, also will remain fairly constant through 1992, then increase in 1993. Other spending varies within a fairly narrow range.

Response to the question on plant improvement showed no definite pattern, although uprating appeared to be the favored approach.

Only two new units were reported planned through 2000. One will burn lignite, the other natural gas.

MAAC			
	Gen	T&D	Other
1989	1,980	1,239	246
1990	1,697	1,228	267
1991	1,337	1,338	250
1992	1,363	1,367	250
1993	1,221	1,205	140
Total	7,598	6,397	1,153

FUEL FOR NEXT UNIT	
Gas	40 utilities
Oil	20 utilities
Coal	13 utilities
Misc.	3 utilities
Hydro	2 utilities
Nuclear	1 utility

PLANT IMPROVEMENT	
Life Extension	46 utilities
Uprating	20 utilities
Modernization	17 utilities
OTHER	14 utilities

Utilities in the Mid-Atlantic Area Council region will spend some \$15.1 billion for new facilities and equipment. This is the fourth largest capital investment program among the nine NERC regions. About 50 percent of the total will go for generating system work, with 42 percent devoted to T&D work. MAAC's generation spending is expected to decrease steadily each year throughout the five-year period, whereas T&D spending will peak in 1992. MAAC is one of the two NERC regions where utilities suffered brownouts and blackouts during the past summer's heat waves. Current plans for individual utilities' next generating units are evenly divided between small units under 100 MW, units between 100 and 249 MW and units between 250 and 499 MW.

The majority of MAAC utilities are involved in some form of unit improvement program. Life extension and modernization are the two most popular activities.

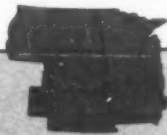


MAIN			
	Gen	T&D	Other
1989	747	839	224
1990	688	958	234
1991	472	1,020	164
1992	414	1,043	175
1993	157	433	118
Total	2,478	4,293	925

Mid-America Interconnected Network utilities, which include electricity suppliers in Illinois, eastern Wisconsin and northwestern Missouri, will invest 73 percent more for transmission, distribution and substation activities over the next five years than for generation projects. Generation spending will decline steadily over the period, from \$747 million in 1989 down to \$157 million in 1993. T&D construction activity will increase annually through 1992, when it will peak at slightly more than \$1.0 billion, then drop substantially in 1993.

Responses to EL&P's survey indicated that no MAIN utilities are planning new units to come on-line prior to 1993, when two small combustion turbine units are scheduled. The region has a substantial reserve generating margin, which was projected to exist until the end of the 1990s. Another superheated summer, such as hit the midwest last year, could change the reserve margin outlook and, consequently, speed up new generating capacity planning activities.

MAIN utilities are busily involved in unit improvement programs, currently favoring life extension and uprating work.



MAPP			
	Gen	T&D	Other
1989	440	432	269
1990	518	478	256
1991	529	526	225
1992	274	545	221
1993	292	584	215
Total	2,082	2,545	1,186

The Mid-Continent Area Power Poolers pool is the smallest of NERC's electrical regions. In total, MAPP utilities also will invest the smallest amount of

capital, \$5.8 billion, in the five-year period 1989-1993.

MAPP utilities will invest slightly more than \$2.0 billion for generation projects during the period, peaking at about \$529 million in 1991 and dropping off to less than \$300 million each of the last two years of the period. Conversely, MAPP utilities' investment in T&D system will increase each year through 1993, when it should reach \$564 million.

Three new small combustion turbine generating units are planned by MAPP utilities for in-service dates through 1993.

Life extension and modernization programs are standard with most MAPP utilities.



NPCC			
	Gen	T&D	Other
1989	1,081	1,761	372
1990	730	1,532	366
1991	784	1,481	354
1992	986	1,439	358
1993	888	1,455	316
Total	4,469	7,668	1,766

Utilities in the Northeast Power Coordinating Council struggled through a difficult summer in 1988, with blackouts and brownouts hitting a number of utilities. Power purchases, from Canada and elsewhere, played a large role in minimizing inconveniences to customers. NPCC utilities reported only two new generating units to go on-line in the current five-year period, neither of which will be baseload steam capacity.

To meet requirements, NPCC utilities are banking heavily on Canadian power. For this reason, NPCC utilities will invest almost \$7.7 billion for new T&D facilities, 71 percent more than the \$4.5 billion they will spend for generating system improvements.

A number of New England utilities are involved in life extension projects, including a number of new programs still in the evaluation stage. Unit uprating activities also are increasing.



SERC			
	Gen	T&D	Other
1989	4,529	2,197	435
1990	3,251	2,325	410
1991	3,421	2,351	447
1992	4,571	2,210	454
1993	5,448	2,381	522
Total	21,220	11,464	2,703

The Southeastern Electric Reliability Council is NERC's largest region, almost any way you look at it—capacity, demand and/or in terms of projected capital spending during the 1989-1993 period. Growth in electric utility activity mirrors shifts in business and population from northern areas to the eastern sun belt states.

Total investment for new and improved system facilities will be almost \$35.0 billion, more than one-fourth of total utility industry capital spending for the 1989-1993 period. Of this, \$21.1 billion will go for generating system improvements and growth, \$11.4 billion for transmission, distribution and substation projects and \$2.7 billion for other programs.

SERC's generation system spending during the period represents almost 40

percent of total industry spending for generation programs for the five-years.

Reporting utilities said that three of their six "next" units to go into service would be completed during the 1989-1993 time frame.

Less than half of SERC utilities reported they are involved in unit improvement programs, about evenly divided between life extension and uprating projects.



SPP			
	Gen	T&D	Other
1989	406	780	139
1990	378	851	145
1991	424	808	135
1992	474	830	135
1993	451	963	216
Total	2,133	4,212	770

Southwest Power Pool utilities will devote the majority of their capital spending and construction budgets to transmission, distribution and substation projects in the next five years. Overall, they will spend more than \$4.2 billion for T&D system improvement and expansion, almost twice the amount they will devote to generation activities.

Life extension programs are standard in most SPP utilities, a substantial improvement from last year's report. Many SPP utilities also are involved with uprating and unit modernization.

Plans for new capacity generally will

WEPCo/EPA scrubber case sets precedent

MILWAUKEE—Wisconsin Electric Power Co.—and scores of other utilities—could wind up spending twice as much for renovations of coal-fired power plants as initial budgets indicate if a court upholds an EPA decision that tightens Clean Air Act regulations.

WEPCo asked the 7th U.S. Court of Appeals in Chicago to review an Environmental Protection Agency decision requiring a WEPCo plant renovation to comply with New Source Performance Standards that would force scrubber installation.

The utility's Port Washington Power Plant renovation involves \$71 million of work on turbine-generators, boilers, mechanical and electrical auxiliaries, and common plant-support facilities for all five units. If EPA's ruling that the old facility must be brought up to the standards required of a new plant, which would mandate scrubbers, it would about double renovation cost for the five units, WEPCo said.

Discussions continue

Both WEPCo and the EPA have filed briefs with the court. Jackie Olson, WEPCo spokesperson, said discussions with the EPA's Chicago office have continued. The schedule for the court proceedings is uncertain, she added. A WEPCo attorney said a decision isn't expected before fall.

The project for the plant was proposed to the Public Service Commission of Wisconsin in July 1987. Later that year, the Wisconsin Department of Natural Resources asked the EPA to concur that the renovation work would not fall under the EPA's New Source Performance Standards or Prevention of Significant Deterioration regulation.

Subject to requirements

However, EPA Administrator Lee Thomas did not agree, and decided in October 1988 that, as proposed, the renovation work be subject to all Clean

not reach fruition until the latter years of the 1990s or beyond the year 2000.



WSCC			
	Gen	T&D	Other
1989	633	2,273	1,168
1990	591	2,067	1,243
1991	640	2,233	1,321
1992	639	2,502	1,296
1993	629	1,677	776
Total	3,132	10,772	5,804

The Western States Coordinating Council is NERC's largest geographical region and the second largest in terms of capital investment during the 1989-1993 period. While it remains one of the nation's faster-growing regions, growth of capital spending plans have declined substantially in this five-year forecast period from the one reported a year ago.

Generating system spending is projected to fall more than 50 percent in the 1989-1993 period, to \$3.1 billion, from the five year period based on figures provided a year ago. T&D spending, although off substantially, is projected to fall only 26 percent, to \$10.8 billion. "Other" spending will increase, to \$5.8 billion for the period.

WSCC efforts are focused on uprating generating units, although life extension and modernization follow closely behind. New units will be largely combustion turbines or combined cycle units, although three hydro facilities are on the planning schedule currently.

Air Act requirements

Subsequent correspondence with the EPA to work out the matter failed, and WEPCo filed its petition to the court, Olson explained.

Other similar projects

Olson listed recent similar projects at other utilities that have not had to comply, including: Duke Power Co.'s Dan River Station Unit 2; Texas Utilities' Sandow Power Plant Units 1-3; Cincinnati Gas & Electric Co.'s Beckjord Station Units 1-3; and Hydraco Enterprises, Old Allied Power House.

An Edison Electric Institute spokesperson said the industry is watching the case very carefully.

Steam release untold in WG

BONN, WEST GERMANY—Human errors in reading controls caused a small amount of radioactive steam to be released Dec. 16-17, 1987, at a 1200-MW nuclear plant in Biblis, West Germany, about 30 miles south of Frankfurt, according to a December report by the Associated Press in *The Orlando Sentinel*.

Public outcry

Although no one was hurt, public outcry continues about the cover-up, which was first revealed in *Inside NRC*, a biweekly newsletter on nuclear safety. Opponents called for the plant's closing, particularly in light of the 1986 Chernobyl accident, AP said.

Full disclosure better

West German officials admit it would have been better to reveal all the details, but the utility insists it followed all reporting guidelines, stated AP.

A spokesman for an environmental research organization compared the type of human error with what happened at the 1979 accident at Three Mile Island, concluded the AP story.

ELECTRIC LIGHT & POWER

EL&P

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

Court upholds 'useful' law

WASHINGTON—State regulators retain the power to decide who pays for cancelled utility facilities under a January Supreme Court decision.

The 8-1 ruling upholds a Pennsylvania

law saying a plant must be used and useful before charging customers for its costs.

The decision rejected the argument that shareholders shouldn't have to bear the loss if a cancelled project was originally deemed prudent.

The ruling has no immediate impact on the two Pennsylvania utilities that challenged the constitutionality of the state law.

As a result of the Pennsylvania ruling, Duquesne Light Co., Pittsburgh, took charges against earnings of \$34.6 million in the third quarter of 1987. Ohio

Edison Co.'s Pennsylvania Power Co. cut \$9.6-million from earnings. Those were two of the five utilities that had invested in now cancelled Davis-Bessie units 2 and 3 and Erie units 1 and 2.

Similar to PSNH case

The Supreme Court decision may dampen Public Service of New Hampshire's hopes for its challenge of a state law that prevents it from receiving Seabrook-related rate hikes until the nuclear plant is in service. A company spokesperson said he was encouraged

Continued on page 6

A New Hampshire Senate bill proposes to acquire Public Service New Hampshire assets by creating a state power authority to condemn and buy PSNH for as much as \$2 billion to prevent federal regulation. Given NU's offer, that apparently won't be enough money. See related story, p. 10.

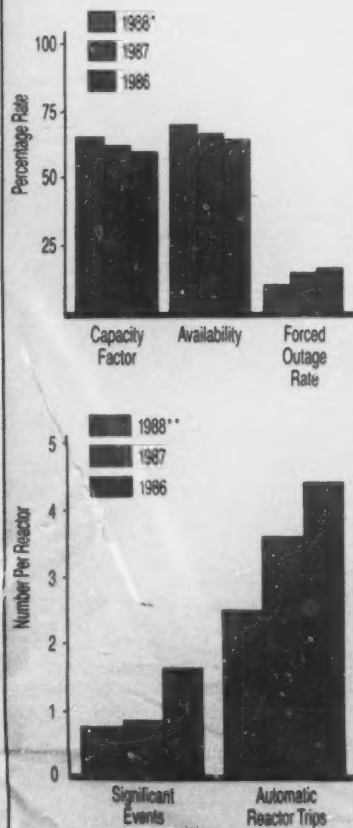
Seabrook operator New Hampshire Yankee by Feb. 1 planned to arrange a way for plant owners to pay \$72 million for decommissioning. The NRC requested such assurance before granting a 5-percent operating license, because of other issues outstanding. After an NRC OK, low-power testing could begin mid-month.

ABB Asea Brown Boveri and Finmeccanica, member of the IRI Group, signed agreements for creating a jointly owned electro-mechanical group in Italy to make boilers, turbines, generators and other power plant equipment. See related story p. 3.

The NRC extended the operating license of the Edwin I. Hatch Nuclear Generating Plant for five years into 2014, for Unit 1 and 2018, for Unit 2. Georgia Power Co., Oglethorpe Power Corp., the Municipal Electric Authority of Georgia and City of Dalton own the plant, whose operation started in 1975.

NUCLEAR PLANT PERFORMANCE IMPROVES

Nuclear power plant performance improved in 1988 over the two previous years, according to the U.S. Committee on Energy Awareness. Six new plants went into service during the year, allowing nuclear power to provide 20 percent of the nation's energy requirements. (See article on page 3).



* Through first 10 months of year

** Projected for whole year, based on first-half data

BE's Pilgrim ascends despite state suit, protesters

PLYMOUTH, MA—Protests followed Boston Edison's Dec. 30, 1988, restart of its 670-MW Pilgrim Nuclear Power Station. About 150 people demonstrated outside the gate Jan. 2, and 27 were arrested for trespassing after stepping inside BE property.

PacifiCorp merges with Utah P&L Co.

PORTLAND, OR—After 17 months of proceedings, PacifiCorp has merged with Utah Power & Light Co. creating the tenth-largest U.S. utility in a stock deal worth \$1.9 billion.

The new PacifiCorp is the third largest western utility, with a commanding transmission network.

PacifiCorp's Pacific Power & Light Co. division and Utah P&L division now serve 1.2 million customers in Utah, Oregon, California, Washington, Wyoming, Idaho, and Montana.

The 10-day pricing period for the exchange ended Jan. 3 with an average price of \$35.713 for PacifiCorp common stock, yielding a .909 exchange ratio. That gave UP&L shareholders about 53.5 million new common shares in trade. UP&L preferred shareholders will receive PacifiCorp preferred on a share-for-share basis.

The deal became final Jan. 9.

Leadership is similar

PacifiCorp's board, at its Jan. 11 meeting, kept Al Gleason as president and chief executive officer; Don C. Frisbee remains as chairman of the board; David F. Bolender stays president of Pacific Power division; UP&L's Frank N. Davis becomes president of that division, but surrenders his CEO position for a seat on PacifiCorp's board.

In addition, three UP&L board members joined PacifiCorp's

And while people protested at the gate, the Commonwealth of Massachusetts filed a suit in federal appeals court seeking review of the Nuclear Regulatory Commission's go ahead for plant operation. The suit also seeks to prevent plant operation above 25 percent.

Four-month ascension, costs

BE plans a four-month ascension to full-power operation. During the first few weeks, new operators are bringing the plant above the critical point and back under to complete their training and perform normal plant maintenance and testing.

During the 32-month shutdown, Pilgrim Station cost BE more than \$600 million—\$200 million for operations and maintenance expense, \$205 million to meet capital costs, and \$200 million for replacement power.

As for protestors and the state's questions about plant safety, BE's David Tarantino said the utility didn't plan to respond to the state's filing until early February, when Pilgrim Station is expected to reach 25-percent operational level.

Tarantino said the NRC called utility's revised emergency plan "far superior."

Continued on page 3

EL&P award presented to GPU

William G. Kuhns, chairman of General Public Utilities Corp., is shown hanging EL&P's commemorative award plaque connoting GPU's selection as 1988 Electric Utility of the Year. GPU's selection as 1988 winner of the annual award was announced in EL&P's November issue. The plaque hangs at GPU's headquarters in Parsippany, N.J. GPU was the 20th electric utility—and the first holding company—to be selected for the annual honor. GPU was selected on the strength of its recovery from the 1979 accident at Three Mile Island Unit 2 and the financial, operational and organizational difficulties that followed. Chairman Kuhns said the award is a testimonial to the dedication and hard work of the company's entire corporate family. GPU's subsidiary and operating companies are GPU Nuclear and GPU Service Co. (both located at the corporate headquarters in Parsippany, N.J.), Jersey Central Power & Light Co. (Morristown, N.J.), Metropolitan Edison Co. (Reading, PA) and Pennsylvania Electric Co. (Johnstown, PA).



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NorLight to extend fiber optic network

NorLight will extend its fiber optic network in Wisconsin to Green Bay, Appleton and Oshkosh this year, according to Wisconsin Public Service Vice President and NorLight Chairman Dan Bolloom. Construction on the 128-mile Fox Valley extension is now in progress. Bolloom said the network currently connects Chicago, Minneapolis, Milwaukee and other cities in Illinois, Wisconsin and Minnesota, and links them to about 175 cities nationwide via other networks.

VT utilities exercise H-Q power deal option

Twenty-four Vermont utilities said jointly that they would exercise an option under their power deal with Hydro-Quebec, to buy an additional 250 MW of electricity. The utilities signed a contract in December 1987 to import 200 MW of Canadian power with the option of buying an extra 300 MW. The 30-year contract for a total 450 MW, is worth about \$4.6 billion, according to the utilities.

Oglethorpe and Georgia Power become joint owners of hydro project

Oglethorpe Power Corp. and Georgia Power Co. have signed an agreement to become joint owners of the Rocky Mountain Pumped Storage Hydroelectric Project. The project, which is 18-percent complete, will be capable of generating up to 848 MW of power, according to Oglethorpe. "After three years of intensive effort, we are excited about finalizing the Rocky Mountain arrangement with Georgia Power and the opportunity we now have to complete the project," stated Oglethorpe

Power President and CEO F.F. Stacy. The utilities plan to start major construction of the project in 1990 and expect commercial operation to begin in 1996. Funding for the facility was made possible through a \$706-million loan guarantee from the Rural Electrification Administration.

Palo Verde Unit 3 sets U.S. generating record

According to owners of the Arizona Nuclear Power Project, Palo Verde Unit 3 recently set a record for generating more electricity in a single year than any other U.S. nuclear unit. The unit reported generating over 10 million MWh during its first year of service. The owners of the project are: Arizona Public Service, Salt River Project, Southern California Edison, El Paso Electric, Public Service Co. of New Mexico, the Southern California Public Power Authority and the Los Angeles Department of Water and Power.

AEP to supply power to Carolina Power & Light

Indiana Michigan Power Co., a subsidiary of American Electric Power Service Corp. (AEP), plans to supply 250 MW of power to Carolina Power & Light Co. for 20 years beginning in January 1990. The electricity will be produced by Unit 2 of the utility's Rockport station, which is scheduled to begin operation in the fall of 1989.

DOE announces two Fermi Award recipients

Richard B. Setlow and Victor R. Weisskopf were named as recipients of the 1988 Enrico Fermi Award by the Department of Energy. Setlow, a biophysicist, was recognized for his contributions to the fields

of radiation biophysics and molecular biology. Weisskopf, a nuclear and high energy physicist, was honored for his contributions to particle and nuclear physics. DOE said the award recognizes exceptional and outstanding scientific and technical achievement in the development, use or control of atomic energy.

South Texas 2 gets OK for low-power testing

The Nuclear Regulatory Commission Office of Nuclear Reactor Regulation issued a license to Houston Lighting & Power Co. for fuel loading and low-power testing at unit 2 of its South Texas Project. The license authorizes testing at power levels up to five percent of full power. Unit 2 uses pressurized water reactors and at full power has an electrical output capacity of about 1250 MW, according to the NRC. Other owners of the South Texas Project are Central Power & Light Co., the city of San Antonio and the city of Austin.

Penelec receives initial approval to close plant

Pennsylvania Electric Co. said it has been granted a conditional approval by the Public Utility Commission to close its Front Street station in Erie before October 1990. Penelec said the approval is contingent upon the commission approving its proposal to discontinue its Erie steam heat service.

TU Electric buys more Comanche Peak shares

Texas Utilities Co. said that its principal subsidiary, Texas Utilities Electric Co., recently acquired a share of the Comanche Peak nuclear plant. TU Electric signed an agreement

with Brazos Electric Power Cooperative to buy its 3.8 percent share of Comanche Peak and settle pending litigation between the two companies. The purchase brings TU Electric's total share of the plant to slightly over 97 percent.

Nature Conservancy, NEP sign agreement

The Nature Conservancy, a non-profit organization dedicated to the preservation of natural diversity, said it has signed an agreement with New England Power Co. (NEP) to protect 11 ecologically significant sites near the utility's hydroelectric plants. According to The Nature Conservancy, NEP is the first electric utility in the country to sign such a comprehensive agreement with the organization. The agreement is part of a five-year, \$10-million project to save 100 critical natural areas along the Connecticut River.

NEES appoints John Rowe president, CEO

John W. Rowe assumed responsibilities as New England Electric System (NEES) president, CEO and director in February. He replaced Samuel Huntington, who was struck and killed by lightning in Aspen, CO, last summer. Before joining NEES, Rowe served as president of Central Maine Power Company.



John W. Rowe

activities in Pennsylvania and the generation of new research and development activities to benefit the state's economy and the natural environment.

UtiliCorp divisions announce promotions

UtiliCo Group, a subsidiary of UtiliCorp United, has announced the promotion of Donald K. Claar from vice president to president. UtiliCo Group pursues opportunities in independent and wholesale electric power generation.

In the West Virginia Power division of UtiliCorp United, John W. McKinney has been promoted to senior vice president, operations and will also serve as chief operating officer of the division.

Control Data sells SIS division to B&W unit

Control Data Corp. has announced the sale of its Scientific Information Services (SIS) Division to Power Computing, a unit of Babcock & Wilcox. The SIS division markets time-sharing services to engineering, scientific and electric power utility customers primarily in the United States. Under the terms of the agreement, Power Computing will assume responsibility for customer contracts of SIS, according to Babcock & Wilcox.

Stone & Webster forms new subsidiary

Stone & Webster, Inc. has announced the formation of its new operating subsidiary, Stone & Webster Development Corporation. The subsidiary will develop projects, primarily relating to power generation, which are wholly or jointly owned and operated by Stone & Webster. James N. White was appointed chairman and president of the company and James E. Huston was named executive vice president.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:

Ariz. Nuclear Power Project A \$200,000 fine for alleged violations of NRC requirements involving radiation protection at units 1, 2, and 3 of the Palo Verde nuclear power station. A \$50,000 fine for an alleged violation of NRC requirements involving reactor operations at Palo Verde Unit 1.
Commonwealth Edison Co. A \$75,000 fine for deficiencies in its testing program for reactor components at the Braidwood nuclear power station.
Consumers Power Co. A \$150,000 fine for failing to adequately test some reactor components at the Palisades nuclear power station.
Duke Power Co. A \$25,000 fine for alleged violation of NRC requirements at the Oconee nuclear plant.

EEL senior VP retires

Edison Electric Institute Senior Vice President and Secretary Prall Culviner has retired and established himself as a consultant. Culviner spent almost four decades with EEL holding various positions including editorial director and vice president-public, employee and investor relations.

PA Energy Research Council picks chairman

The Pennsylvania Electric Energy Research Council has chosen Eugene R. Cathcart as its first chairman. Cathcart is vice president technical-generation at Pennsylvania Electric Company. The council, made up of members from investor-owned utilities and the Pennsylvania Rural Electric Association, coordinates energy research ac-

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More coal, N-plants fuel 1988 demand growth

WASHINGTON—The nuclear and coal industries both boasted record years in 1988 as utilities enjoyed healthy gains in kilowatt-hour sales to industrial and commercial customers.

Six nuclear plants began service in 1988, increasing the nuclear share of U.S. electrical production from 18 to 20 percent, according to the U.S. Council for Energy Awareness. And the coal industry, boosted by high utility consumption and good economic conditions, enjoyed a third consecutive year of record consumption, with 958-million tons, stated the National Coal Association.

In 1988, the industrial and commercial sectors of the U.S. economy accounted for the major portion of electric demand growth with gains of 5.0 and 5.2 percent, respectively, in the first three quarters, USCEA said.

Demand increase exceeds forecasts

Overall, 1988 electricity demand exceeded most forecasts. Figures indicate 1988 growth at 4.5 percent, spurred by Gross National Product expansion of 3.9 percent, cited USCEA. NCA projected a slightly higher 1988 year-end electric demand growth of 4.8 percent.

New England had an early case of winter jitters: the first cold snap drove electricity consumption to a new record on Dec. 12, 1988, eclipsing the previous high, set last Aug. 11. The early cold wave, combined with strong consumer demand, set record winter peaks in Michigan and New York State, as

Nuclear Power Plant Performance			
Average Per Reactor	1988*	1987	1986
Capacity Factor	66.2%	62.0%	60.4%
Availability Factor	71.0	67.2	65.5
Forced Outage Rate	10.3	15.1	16.6
Significant Events	0.80**	0.85	1.66
Automatic Reactor Trips	2.52**	3.64	4.41

*Through October 1988.
**Projected, based on data for first-half 1988.
Source: U.S. Nuclear Regulatory Commission.

well. (See related story, page 8.)

In July and August, a number of utilities found themselves in the 1990s, in terms of power demand. Brownouts, rolling blackouts, voltage reductions and supply problems pointed to a dangerous narrowing of capacity margins in some regions.

The problems of reduced margins, especially for the mid-term future, was compounded by a 15-year low in large and small plant construction by utilities and independent power suppliers. Utilities have elected not to assume the financial risks resulting from state regulators' negative ratemaking decisions, USCEA commented.

In the past decade, state regulators have disallowed recovery in electric rates of nearly \$9 billion in plant con-

struction costs. About 13 more utilities await decisions concerning inclusion of plant construction cost in their rate bases. With such uncertainty about state regulatory treatment of capital-cost recovery, utilities are reluctant to invest in new baseload plants, USCEA said.

The rate of current construction can sustain electricity demand growth of only 1 percent per year, but average growth for the past five years, including 1988, is 3.6 percent. Clearly, USCEA pointed out, there is trouble ahead, but more reliable nuclear plants can help meet demand in some areas.

N-capacity, availability increase

Both the capacity factor and availability of nuclear plants seem likely to continue to increase, USCEA predicted. The average capacity factor—percentage ratio of actual nuclear plant output

Electricity Demand Growth			
	Through Sept. 1988	Full Year 1987	Full Year 1986
Residential	+4.5%	+3.9%	+3.0%
Commercial	+5.2	+5.0	+6.1
Industrial	+5.0	+4.6	+3.2
Other*	+5.8	+4.1	+9.3
TOTAL	+4.5	+4.5	+1.1

*Includes electricity sales to government, railways, street-lighting, authorities and sales not included elsewhere.
Source: U.S. Department of Energy's Energy Information Administration "Monthly Energy Review," September 1988.

to maximum potential output—for the first 10 months in 1988 was 66.2 percent. If the seven plants not operating

Continued on page 7

Justice Department cautions ABB/Westinghouse ventures

WASHINGTON—Westinghouse Electric Corp. and Asea Brown Boveri Inc. were negotiating with the U.S. Department of Justice at EL&P press time in an effort to remedy "anticompetitive aspects" of the two companies' proposed joint ventures, one for the manufacture and marketing of generation equipment and the other for transmission and distribution apparatus.

Although company representatives seemed encouraged that a deal could be worked out to thwart a Justice Department suit, none would reveal any details about the talks.

However, sources inside both companies suggested that the generation joint venture is probably dead. Only through sale of one of the two power transformer businesses could the T&D venture be concluded, the sources said.

On Jan. 9, the department's Antitrust Division advised the parties that both joint ventures would violate Section 7 of the Clayton Act, which prohibits anticompetitive mergers.

"Because of the significant role the joint ventures' products and services play in the generation and transmission of electric power, the reduction of competition in these markets would likely mean higher electric rates for all users of electricity and higher prices for many products manufactured using electricity," explained Charles F. Rule, assistant attorney general in charge of the Antitrust Division.

The competitive concerns caused by one of the ventures focus on the sales of power transformers. Combined Westinghouse and ABB U.S. sales of power transformers would exceed 50 percent of the total U.S. market last year, more than \$400 million.

The generation venture combines two of the three leading suppliers of medium and large steam turbine generators. The other is General Electric of Fairfield, CT. Only two other firms have made any U.S. sales of such equipment over the last five years.

Finally, Rule pointed out, Westinghouse and ABB are two of only four significant sellers of major turbine generator repair and related services to U.S. utilities, the other two being GE and Utility Power Corp., a subsidiary of Siemens A.G. of West Germany.

U.S. sales of steam turbine generators and pertinent services are estimated at more than \$600 million a year.

Westinghouse is based in Pittsburgh and Asea Brown Boveri Inc. is headquartered in Purchase, NY.

In connection with the Westinghouse ABB Power Transmission joint venture a new company—ABB Power Systems Inc.—will be established with headquarters in North Brunswick, NJ, ABB announced in December.

Carlos N. Diaz, former president of Asea Brown Boveri Ltd., Sao Paulo, Brazil, was appointed president of ABB Power Systems Inc. as of mid-January.

Reagan's budget: utilities pay all NRC costs

WASHINGTON—The Reagan budget proposes that nuclear utilities pay for all Nuclear Regulatory Commission costs, \$426 million for FY-1989 and \$475 million for FY-1990. Last year, the amount utilities paid increased from 33 to 45 percent.

The Omnibus Budget Reconciliation Act of 1987 required the NRC to collect 45 percent of its \$392.8-million fiscal-1988 budget, or \$177 million, from the reactor systems it regulates. That increase, up from 33 percent in 1987, amounted to \$350,000 per reactor.

EEL opposes 100-percent payment

Although it's not clear yet if the Bush Administration, or Congress, would keep the 100-percent requirement, the Edison Electric Institute spoke out sharply against the proposal. A spokesperson pointed out that the NRC spends far less than 100 percent of its budget for regulating licensees.

The Department of Energy budget asks for \$15 billion, a 7.7-percent increase over last year. DOE's energy research and development budget, \$3.6 billion, includes \$325 million for the clean coal program.

In millions, R&D for fossil energy would decrease from \$380.6 to \$163.6; conservation, \$162.6 to \$87.9; renewable energy from \$150.5 to \$114.0; and nuclear energy R&D \$354.9 to \$352.9.

Defense, 60 percent of the department's budget, was increased \$927 million to modernize and improve safety and environment within the nuclear weapons complex.

DOE also asked for \$250 million to begin the Super Collider project.

Bush names energy chief

In a related development, President George Bush named retired Adm. James Watkins, a nuclear submariner, as energy secretary on Jan. 12.

from page 1

BE's Pilgrim ascends...

or" to plans previously in place. In December, the NRC staff indicated no deficiencies or weaknesses in the annual on-site emergency preparedness exercise. The NRC Inspection Report states BE's "emergency response actions were adequate to provide protective measures for the health and safety of the public."

Ralph G. Bird, senior vice president-nuclear, reaffirmed BE's commitment to continue working with the Commonwealth and local towns to complete the upgrade of off-site emergency plans.

Major improvements

Pilgrim additions included installation of a:

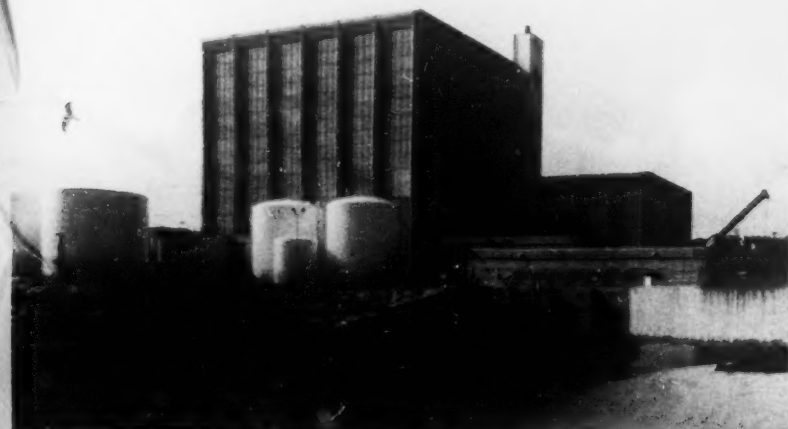
- Third diesel generator to guard against station blackout.
- Hard-pipe vent path from the torus to the main stack, reducing long-term stress on containment by providing another method of cooling the torus should primary cooling fail. It also reduces the amount of radioactive mate-

rial that would be released to the environment by filtering the effluent through the water in the torus.

- A more effective, enriched boron-10 solution in the standby liquid control system. That system injects a boron solution into the reactor for shutdown in case the control rods fail to operate.
- Another diesel-driven firewater pump as a backup.

Plant improvements included:

- Improvements to the reactor control systems, including the addition of an automatic shutdown circuit for feedwater pumps in the event excessive reactor pressure. The setpoints of the reactor-core isolation system also were changed to allow greater range of operation during accidents.
- Modified containment spray nozzles for a lower flow rate for fewer restrictions for greater control of containment temperature and pressure, fission product scrubbing and core debris cooling.
- Various switchyard control modifications to improve reliability.



Boston Edison Co.'s Pilgrim nuclear plant restarted after a 32-month shutdown and \$200 million in repairs and maintenance. The outage cost BE \$605 million, with capital and replacement power.

COMMENTARY

'As Maine goes, so goes the nation?' Let's hope not.

The old political adage—As Maine goes, so goes the nation—may be accurate more often than it's wrong in presidential elections. But in terms of regulatory precedent, we would hope that there is no relationship between what our most Northeastern state does and what will be done elsewhere.

The reason for our concern is that the Maine Public Utility Commission has ruled against a program under which Central Maine Power Co. would construct a tie-line to the Maine-Quebec border to import Canadian power generated in Northern Quebec and contract for 300-MW over 29 years starting in 1992. Instead of allowing Maine consumers the use of abundant, economic and available Canadian electricity, the PUC has ruled that conservation, load management and non-utility generation are the way to go. Rather than guaranteeing an abundance of economic electricity, the PUC has elected to go the other way and share a shortage. The only real question is how soon?

There are several fallacies in the Commission's reasoning. It seems to us. First, conservation has two characteristics. It appeals most and is most affordable to the affluent, who can afford to replace old, low-efficiency electrical devices with new, efficient ones. As a result, it penalizes those unable to install those new energy-efficient devices by forcing them to simply use less, or certainly no more electricity than at present, and to pay relatively higher costs because of their appliances' lower efficiencies.

Second, Commission-imposed conservation, without construction of the tie-line to Hydro Quebec, means Central Maine must keep its generation system up and operating longer. Older units that might be shut down in low-demand periods may have to be operated, regardless of poor efficiencies, unfavorable economics or environmental penalties. Cogeneration and other non-utility generation can mitigate against this, perhaps, to some degree. But there are some questions about reliability and cost here too.

Third, the Commission's decision will reduce CMP's independence and self-sufficiency. If Maine electrical users don't conserve sufficiently, or if weather conditions and unscheduled outages combine to leave Central Maine in an energy-deficient condition, or the economic growth rate accelerates, CMP will be faced with buying emergency power from other New England utilities, who already are becoming increasingly dependent on imported Canadian power. And rates under emergency conditions seldom tend to be low.

Fourth, the Commission's ruling apparently gives little weight to the economic and environmental benefits CMP's customers already have enjoyed from the Canadian power the company has been able to import already. Favorable contract conditions have reduced avoided costs and, as a result, the rates CMP pays for power generated by non-utility sources. Ratepayers have profited from the past arrangements between the CMP and the Canadian utility, a principle reason the Hydro-Quebec project was supported so broadly by individuals and groups throughout the state.

Finally, and perhaps most importantly, the Maine PUC's decision seems to substitute the Commission's decision-making for that of utility management. Such a pro-active invasion of the Commission into the mid- to long-term power-supply planning and decision-making of the utility's management leaves the utility responsible for meeting customers' demands, but may preclude it from meeting that responsibility. If the Commission's actions before the fact should prove to be wrong, who will make up the power-supply deficiencies? The state government has no electrical capacity. The commissioners responsible for the decision will be long gone. So who's left? Only Central Maine Power will be around to bear the ire of customers and to obtain needed power from wherever to meet consumers' needs.

Conservation is a tool. Load management is a tool. Use of off-system power supply is a tool. New power plants and transmission lines are tools. The choice of which tool or tools should be used to do the job, it seems to us, is best left to the one responsible for doing the job. And in this case, that is the utility.

We would hope that other commissions do not take the Maine PUC's actions as a guide. Long-term, such an approach can only lead to problems of far greater consequence than those the PUC actions are purported to solve.

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Smart house, rebates top energy-efficiency projects

BARRINGTON, IL—As capacity margins narrow in many regions, alternate power suppliers line up, and utilities begin to assess the cost of building new capacity, conservation and methods of improving efficiencies of energy use become attractive alternatives.

National organizations and individual utilities are actively involved in developing new approaches to reduce demand growth.

Houses get smart, electrically

On the national level, the Edison Electric Institute, Electric Power Research Institute and others are developing the Electric Smart House. The \$3-million project is scheduled to be commercially available by 1992 for homes in all price levels and all regions.

The project was organized by EEI in cooperation with the National Association of Home Builders (NAHB), National Research Center, EPRI and the National Rural Electric Cooperatives Association. The purpose is to demonstrate added energy efficiency, convenience and safety, and advance home automation and building techniques.

Construction of the prototype single family home, starting this spring at NAHB's National Research Center headquarters in Bowie, MD, will be completed by midyear. Later stages of the project will apply the concept to multifamily dwellings and retrofitting existing homes.

Included in the homes will be super-insulations; new "smart," energy-efficient appliances; "thermal envelope" weatherization; and a single wiring network to safely control the distribution of electricity and communications.

Thirty-five utilities are participating directly in the project.

CL&P builds efficiency incentives

Connecticut Light and Power Co. is offering to pay some or all incremental design and construction costs of energy-saving features in new buildings, one of 13 services forming CP&L's Energy Alliance plan for demand reduction.

The \$24-million, 1989 investment is expected to save 970 GWh over the life of the new energy-efficient equipment.

Incentives are based on lifetime kilowatt-hour savings of energy-efficient lighting, motors, heating and air conditioning equipment and controls, and added insulation up to 3.6¢/kWh over equipment lifetime. That amounts to \$15 for each four-lamp lens-type lighting fixture with one electronic ballast.

CL&P has demonstrated it can reduce a building's energy use by 36 percent without raising construction cost.

A recent CP&L residential program over seven years helped more than 200,000 households reduce costs, saving customers more than \$42 million. A nonprofit organization now provides similar conservation measures.

BE pays generators, off-peak chillers

Boston Edison Co. also offers new construction incentives as part of a "Power Package" of 31 programs.

Efficient electrical systems bring rebates, cool storage systems earn up to \$200/kW shifted, and standby generators qualify for up to \$60/kW annually for use at BE's request at summer and winter peaks.

Regulators push all-source planning

On Feb. 15, Massachusetts Department of Public Utilities (DPU) will hold public hearings on a new all-source bidding process designed to increase power supply options, including those to lower demand and energy costs through conservation and load management, independent power produc-

ers, qualified facilities under PURPA, and the utility itself.

Every two years the state would review utility long-range plans and require utilities to participate in bidding to meet projected energy needs.

DPU Chairman Bernice K. McIntyre said, in part, "Such a process would significantly increase the regulators' and therefore the public's participation in decisions previously made entirely by the electric company with only after-the-fact review."

NSP energy conservation magazine

Northern States Power is publishing a quarterly four-color magazine called *Premier* that highlights business developments of commercial and industrial (C&I) customers.

NSP wanted a fresh approach to strengthening relationships with its 100,000 C&I customers to relate messages of low electric rates, energy savings programs, conservation, load shifting and peak clipping, while encouraging expansion or relocation within its service area.

"This publication will cut through the normal marketing clutter of direct mail pieces and bill inserts. It also uses our limited marketing promotion dollars more efficiently," said Pam Fricke, NSP's manager of marketing communications. "It has the impact of advertising and the targeting of direct mail."

WEPCo pays \$23 M in 'Smart Money'

Over the past two years, Wisconsin Electric Power Co. has paid its residential customers more than \$23 million for investing in electric efficiency in their homes through their Smart Money program. Residential peak demand was reduced 47 MW, 188 percent more than the original goal of 25 MW.

Incentives include zero-interest loans and rebates from \$10 to \$650 for the purchase of energy-efficient appliances and light fixtures; \$100 savings bonds for removing older, inefficient appliances; custom-designed conservation measures for electrically heated homes; and a special offer covering substitution of compact fluorescent lights for standard incandescent lamp bulbs.

A goal of reducing commercial and industrial demand by 100 MW was surpassed by signing on reductions totaling 108 MW, but only 62 MW were completed by the end of 1988.

MG&E offers rebates to shave peak

Record high summer demand helped prompt Madison Gas & Electric Co. to offer a new, comprehensive set of energy conservation services to business, including cash rebates.

Incentives cover from 25 to 50 percent of materials and installation costs through the business' own contractor or supplier, providing a quicker payback of project costs, said Claire Fulenwider, MG&E director-marketing. Typical measures can reduce lighting bills by 50 percent and overall electric bills by up to 20 percent.

Florida solar owner satisfaction

More than 94 percent of a sample of 1000 Florida homeowners with solar water heating expressed satisfaction in a random survey conducted by the Florida Solar Energy Industries Association. More than 85 percent of those surveyed said they would purchase another solar system for their next home.

Although more than one million U.S. homes have solar water heating, the U.S. lags behind other industrialized nations in utilizing solar thermal applications, said Scott Sklar, executive director of the Solar Energy Industries Association, a manufacturers group.

New consumption and production records set

BARRINGTON, IL—Around the country and around the world, electrical demand is reaching new heights; while in North America, at least, electrical generation is also continuing to set new records.

In New England, consumers used a record amount of electricity on the frigid evening of Dec. 12, 1988, according to the New England Power Pool (NEPOOL). Demand shot up to 19,596 MW, establishing an all-time power system peak for the six-state region.

The new peak surpassed the old record of 19,500 MW that was set during broiling summer weather on the previous Aug. 11. The new winter peak also represented a nearly 2-percent increase over the prior winter record of 19,277 MW set on January 14, 1988.

NEPOOL officials noted that there was no shortage for most customers during the recent peak because supplemental power supplies were available from utilities in New York and Canada. Also helping were the voluntary cutbacks made by commercial and industrial customers in the early morning

and early evening on Dec. 12.

The most recent forecast by the pool for the winter period was that demand might reach even a higher plateau of 19,800 MW during January 1989.

Nearby Long Island

Long Island Lighting Co., too, hit a wintertime record peak, but on the freezing night of Jan. 4. The demand went up to 3017 MW at 7 p.m., which surpassed the previous record of 2995 MW set on Dec. 12, 1988. The new record left behind the '87-'88 heating season peak of 2935 MW set on Jan. 14, 1988.

Said William Museler, LILCo vice president of electric operations, "The record demand was caused by high winds and subfreezing temperatures which resulted in higher-than-normal usage of electric heaters." He also explained that the demand exceeded company forecasts for the '88-'89 winter period. But he went on, "We also have added more than 13,000 customers this year as Long Island continues to grow..."

Switch the spotlight to Michigan where Consumers Power, for the 22nd consecutive month, delivered a record amount of electricity in Dec. 1988. Sendout was 2.73-million MWh. This was 5.3-percent higher than was reached in December 1987, the previous high for a month for Consumers.

And a new all-time peak of 5025 MW was set by the utility on Dec. 12, 1988. This, in turn, was 8.4-percent higher than the highest demand for a December in the utility's history.

Rounding up 1988's figures, Consumers reported that total electric sales were 29.3-million MWh, 5.2 percent above 1987 sales and the fifth consecutive year of record electric sales.

The 1988 sales growth was the highest annual percentage increase for the utility since 1976, and more than 70 individual record sendouts were set in '88. One of these was the all-time peak demand of 5869 MW on Aug. 17, which marked the third consecutive year with a new all-time peak.

Over the past five years, demand has grown 17.3 percent in the utility's service area.

vice area.

William McCormick Jr., chairman and CEO of CMS Energy Corp. (Consumers' parent company), noted, "The pattern of sustained growth in electric demand from our customers is clearly established." He also pointed out that Consumers' operating reserve margin had shrunk from 28 percent in 1983 to just 9 percent on the record day, less than half the 23-25-percent level considered prudent by state regulators and utility experts.

And you think we got it bad...

In the United States, we apparently are rather well off, as seen from the preceding items. But not so in some other parts of the world.

Factories in China are having to shut down completely due, the government there reports, to a shortage of coal, which supplies 80 percent of the country's power. One-fifth of China's industrial capacity is estimated to be idled by the energy crisis, according to *The Wall Street Journal*.

Continued on page 10

Recent utility workforce trimmings continue trend

LEXINGTON, MA—Investor-owned utilities continue the trend of serving customers with fewer employees, according to a consulting firm's recent survey of 120 investor-owned utilities.

The number of electric utility employees serving 100 customers declined

from 7.41 in 1986 to 6.76 in 1987, while the number serving gas customers also decreased from 4.29 to 3.76 during the same period. These results reflect continuing cutbacks in electric utilities since 1986, and streamlining at gas utilities since 1983, said consultants at Temple, Barker & Sloane Inc.

Increased competition

Increased competition

The decline, said Robert Wayland, head of TBS's energy group, may be attributed to increased efforts to streamline in anticipation of increased competition, in addition to the completion of major construction programs and the use of contract personnel.

Examples of utility reductions in recent months include Duke Power Co., Public Service New Mexico, Tennessee Valley Authority and Arizona Public Service Co. None of those utilities, however, said those workforce cuts would be their only method of streamlining.

Management style change needed

Because the more traditional methods of staff reductions, such as attrition, freezes and early retirement programs, have been nearly exhausted, TBS suggests that changes in utilities' management style are now required to permanently reduce costs.

"The days of reducing the work force without changing the way it is managed are coming to an end," explained Rodney Plimpton, a vice president in TBS's organizational analysis group. Reducing headcount without basic management changes can weaken the utility, he warned. More self-management and less bureaucratic control can help by building teams at the top, enabling workers and management to understand what is being done and why, he said.

Simpler organization

This results, the consultants stated, in simpler organization with clearer responsibilities and more individual commitment to common goals.

About 34 of the utilities reported extensive restructuring or reorganization programs in the last three years and 31 percent reported early retirement programs. In all, 63 percent of the respondents had used some kind of staff cut-back program.

Investor-Owned Utilities Report Continuing Staff Reductions 1988 Staffing Survey				
Type of Reduction	Percentage of Utilities Reporting Staffing Programs			Total Investor-Owned Utilities
	Electric	Combination	Gas	
Early Retirement Programs	44	15	21	31
Reorganization/Restructuring	39	32	21	34
Layoffs	12	20	8	14
Attrition	29	20	14	21
Hiring Freezes	27	24	8	23
Other	15	6	8	11
At Least One of Above	68	68	36	63

Source: Temple, Barker & Sloane Staffing Survey

from page 1

PacifiCorp and UP&L merge...

board—Michael Leavitt, John A. Lindquist, and Don Wheeler. With the resignation of two PacifiCorp board members, the number stands at 19.

Organizational changes include the creation of two executive vice presidencies at each utility division in charge of operations and administration. Power for both divisions is consolidated under the executive vice president of power supply, Robert Smith who will move to the Utah division and report to Davis. Smith was formerly Pacific Power's senior vice president-power supply.

The executive vice presidents of administration will split support duties between the two utility divisions, although each division will maintain some staff for each function. The goal,

explained Pacific Power's Patrick Slatery, is to avoid duplication of services, especially at the senior management level.

Combined workforce is now 8968 and the target is to reduce that by 500 over five years through attrition, Slatery said. Some personnel—about 60 the first year—will be moved between divisions.

Savings from merge: efficiency

Utility executives anticipate savings of \$500 million over five years from added efficiencies. The combination yields about \$2 billion in combined annual revenue, a 28,000-mile transmission network, and a better demand curve through the combination of opposite seasonal peaks. UP&L has primarily coal-fired generation and a summer peak, and Pacific Power, about one-third hydro and a winter peak.

Conditional approval

After regulatory approval came from all seven states the two companies operate in, the Federal Energy Regulatory Commission conditionally approved the merger with special stipulations for transmission access. The Utah commission reexamined the merger and



Dave Bolender



Frank Davis

reapproved, projecting that its customers would save at least \$95 million in present dollars within the first five years, with benefits increasing in later years (EL&P, p. 1, Dec. '88).

Both utilities stated that costs of the FERC conditions—about \$5 million for five years—are minimal compared to the overall benefits and savings.

Transmission rules not a precedent

Industry concern over the transmission limitations seem unfounded. Martha Hesse, FERC chairman, has said the transmission ruling only applies to this case and was not intended to be a national policy on transmission access.

The last in a long string of approvals came from the Nuclear Regulatory Commission, needed because of Pacific Power's 2.5-percent ownership share in the Trojan nuclear plant.

Looking at combined financial performance for the companies through September 1988, earnings were: \$325 M, up from \$277 M; earnings per common share: \$2.64, up from \$2.27; net income: \$340 M, up from \$294 M; assets: \$9.1 B, up from \$9.0 B at the end of December '87.

Before the merger, PacifiCorp's non-utility holdings—mining and resource development, telecommunications and financial services—brought about 40 percent of all earnings.

UP&L ratings drop

Because the merged UP&L will incur initial fixed-charge coverages and a capital structure ranking below that of pre-merger UP&L, Moody's Investors Service downgraded UP&L credit ratings in late December. Despite that, Moody's praised the numerous benefits to both companies, including the ability to play a major role in the rapidly developing firm and non-firm competitive power market. PacifiCorp is now a transmission utility for other utilities in the region, analysts said.

Expected benefit

UP&L ratepayers are expected to benefit from a 2-percent rate decrease immediately with a total of 5-10 percent, subsequently.

UP&L is based in Salt Lake City.



Al Gleason



Don Frisbee

EL&P

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

PUC limits Midland use

LANSING, MI—State regulators issued a complex, interim order that requires Consumers Power Co. to cut by 48 percent a electricity sales contract with the Midland Cogeneration Venture (MCV).

The reaction at Midland Cogeneration Venture and CMS Energy Co.'s Consumers Power subsidiary was one of disappointment, but neither would comment in detail. Both are analyzing the order, and deciding how to respond.

Work continues on the 12-turbine, natural-gas, combined-cycle project, scheduled for commercial operation in January 1990.

Guidelines

In part, the Michigan Public Service Commission's Jan. 31 ruling establishes guidelines for cogeneration and small power production in Consumers' service territory.

The decision seems a response to

more than 40 additional applications or complaints from other proposed cogenerators and small-power production qualifying facilities (QFs) that want to supply electrical power to Consumers.

Consumers contracted for up to 1240 MW of MCV electricity by 1995; the order cuts that to 638 MW initially, with options for review every two or three years. The order also:

- Caps the amount of total Consumers capacity purchases at 1160 MW, with not more than 55 percent coming from one project and no more than 75 percent from one fuel.

- Sets Consumers' avoided capacity rate at 3.77¢/kWh.

- Backloads capacity payments for natural gas or oil with a rate 25 percent lower than a levelized payment in order to reduce ratepayers' risk of premature shutdown of QFs. Coal- or peat-fired projects should be backloaded by 10

percent, the PUC said.

- Asks Consumers to try and renegotiate contracts that have already been signed [with MCV] to conform to these provisions, then negotiate for power from other projects.

Continued on page 14

Judge delays PSNH rate case; federal vs. state authority next?

MANCHESTER, NH—Public Service of New Hampshire won a bankruptcy court injunction to delay a state-ordered rate case for six months to prevent what PSNH called "interference with reorganization" from state regulators.

The ruling did not address the state's intentions or motives in seeking a PSNH rate proceeding during the company's reorganization. PSNH would have had to divert attention from reorganization to work through a rate case, which could have raised or lowered rates.

Larger Issues

On Feb. 22, shortly before this issue of EL&P went to press, Judge James E. Yacos planned to address the larger issue of whether or not utility reorganization in bankruptcy proceedings overrides state law. PSNH plans to reorganize primarily under federal jurisdiction. The state says it won't approve such a move.

In yet another matter, the PSNH ar-

gued that state Senate Bill 205 on government takeover should be rejected because it is based on false premises. The proposal would form a public authority and sell up to \$2 billion in bonds to take over the utility. The state's attorney general has the issue of condemnation procedures before the state supreme court to determine constitutionality of a utility takeover. PSNH said any offer would have to be at fair market price, in excess of \$2 billion. Northeast Utilities Co. bid more than \$2 billion. All bids are due by the end of March.

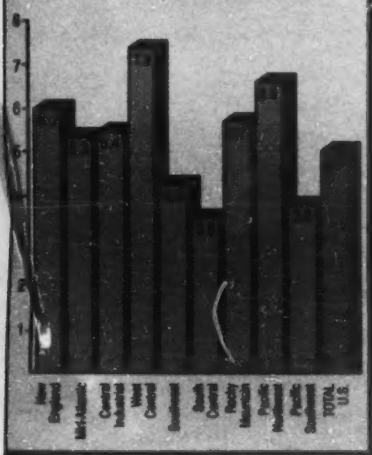
Takeover premise may be tested

PSNH quoted PUC documents as saying a state takeover could lead to first-year rate increases as high as 40.29 percent. In contrast, PSNH proposed a one-time, 31-percent increase. In reorganization talks, the state has offered PSNH a rate increase of 4 percent annually for five years. PSNH said that despite recent events it hopes to return to

Continued on page 15

ELECTRIC OUTPUT

From 1987 to 1988 the net electrical energy sent out for the whole year by the electric industry in the contiguous 48 states increased by 5.0 percent, to 2.77-million GWh, according to the Edison Electric Institute. Note that the largest increase was in the West Central states, while the smallest was in the South Central region. However, in terms of overall sendout, the Southeast led with 629,000 GWh (ah, summer-time), and the lowest was in New England with 111,000 GWh.



CommEd cuts deeply to survive rate freeze

Mark T. Hoske
Assistant Editor

CHICAGO—Commonwealth Edison Co. must take "extraordinary steps" to maintain its financial health through a recently approved, \$480-million, 9-percent rate increase over two-years, followed by a four-year rate freeze.

That translates to a 31-percent, 825-employee reduction in supervisors company-wide, although a smaller percentage will be cut from the nuclear area. The 825-employee cut will reduce management to 1825 through attrition and reassignment. Union employees, who comprise the balance of the company's 18,000 total workforce, will not be affected.

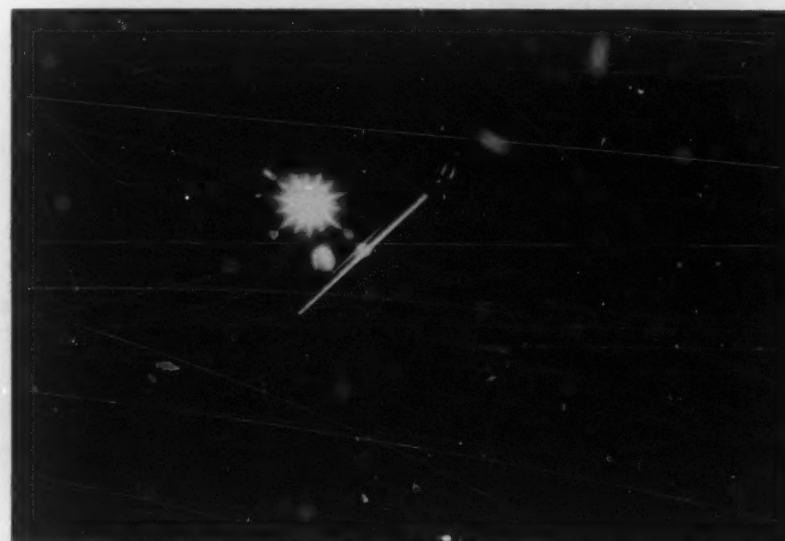
"Even with this rate relief, we must take extraordinary steps to control expenditures and insure our financial health," Chairman James J. O'Connor told employees.

One third of investment recovered

After the rates are fully implemented, CECo will recover only about one-third of its \$7.1-billion investment in its last three nuclear plants, said company spokesperson John Hogan. A 27-percent, \$1.4-billion increase was originally requested.

Hogan anticipates that the cutback program will save "well in excess of \$10 million," but hesitated setting a specific target because of company critics.

Continued on page 9



California solar plants win ASME award

The Solar Electric Generating Systems (SEGS) plants won an ASME Energy Resources Technology Industry Award for their builder/owner, Luz International Ltd. The parabolic solar collectors focus on steel tubes surrounded by vacuum-insulated glass tubes to concentrate the sun's rays on a heat-transfer fluid. They are entirely privately financed. (See story on page 44.)

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APS buys developer of energy mgmt. systems

Arizona Public Service Co. has acquired Stagg Systems, a developer of energy management systems for electric utilities. Immediate plans for Stagg, which will become a wholly owned subsidiary of APS, include the establishment of a demonstration facility at APS' system control center in Phoenix, according to Glenn Stagg, president of the company.

California Energy adds four geothermal plants

California Energy Co. said it is adding four new generating plants to its Coso Project in Coso Hot Springs, CA. The company expects the first phase of its nine-unit, 230-MW geothermal complex to be completed in the fourth quarter of 1989. All electricity generated from the project will be sold under long-term power sales contracts with Southern California Edison Co., according to California Energy.

In other news, California Energy was cited by the California Energy Commission for its achievements in geothermal power production and environmental control technology, and received approval of its Navy II Project. The commission said that Navy II, located in Coso Hot Springs, CA, has the highest environmental regulatory standards in the nation.

Niagara Mohawk seeks proposals for 350 MW

Niagara Mohawk Power Corp. will seek proposals from independent power producers for 350 MW of electric capacity through a competitive bidding program. The utility predicts it will need the extra power by 1994. Niagara Mohawk said it is awaiting approval of its bidding procedures by the New York State Public Service Com-

mission and expects its first bid request later this year.

GE, Alsthom start gas turbine co. in Europe

According to General Electric Co. (USA), Alsthom of France and General Electric Co. (UK) signed a Memorandum of Understanding to establish a European gas turbine company. The principal assets of Alsthom's Gas Turbine Division and the GE (UK) Ruston Division will be included in the new company. Ruston designs and builds industrial gas turbines and Alsthom builds heavy duty gas turbines as a GE licensee. GE (USA) said it will hold one third of the company's equity.

Coal-fired beat hydro in '88 at Idaho Power

Idaho Power Co. said that in 1988 its share of jointly owned coal-fired plants produced more energy than all of its hydroelectric plants combined. For the first time in the company's 74-year history coal accounted for 51 percent of Idaho Power's total output, while hydro generated 49 percent. During normal streamflow conditions, hydro usually produces about 65 percent of the generation, according to the utility.

Financial restructuring to save Detroit Edison over \$10M in next 5 yrs

Detroit Edison expects to save at least \$10.5 million over the next five years due to the restructuring of its \$400-million nuclear fuel financing arrangement. Detroit Edison Vice Chairman and Chief Financial Officer Ernest L. Grove Jr. said one of the major cost-saving changes involved consolidating the entire financing package under one credit agreement. "As Fermi 2's nuclear fuel requirements increased

over the years, our financing program became more complicated and more costly to administer," Grove explained. "We were dealing with credit agreements with five different banks as well as the heat purchase contract with Renaissance Energy." Grove added that Detroit Edison will also benefit from renegotiated fees with Renaissance Energy and other parties involved in the financing arrangement.

NRC issues report on the state of Palo Verde

In its annual report on Arizona Nuclear Power Project's Palo Verde Nuclear Generating Station, the Nuclear Regulatory Commission found "satisfactory" performance with need for improvement. The NRC said the performance of Unit 3 was strong and Unit 2 displayed generally good performance, but Unit 1 operations were criticized. The NRC also criticized the radiation protection, safety assessment and quality verification in all three units. In reaction to the report, ANPP Executive Vice President Don Karner stated that, "Although the overall trend of the plant has been improving for the past several months, we can and will do better."

EPRI creates Customer Systems Division

The Electric Power Research Institute has formed a Customer Systems Division to help "...member utilities and their customers realize maximum value from electricity," according to the new head of the division, Vice President Arnold Fickett. The new organization, which supersedes the Energy Management & Utilization Division, is responsible for: developing electric technologies for the industrial, commercial, residential and transportation sectors; demand-side plan-

ning; market assessment; and power electronics and controls.

Kearney to head PG&E/Bechtel joint venture

Joseph P. Kearney was appointed chief executive officer of a joint venture formed by Bechtel Power Corp. and PG&E Enterprises, a subsidiary of Pacific Gas and Electric Company. The venture will develop, manage, own and operate private non-utility electric generation facilities throughout the United States. "We believe that a growing part of the nation's future electricity needs will be met by non-utility generation. Our aim is to become a major player in this market and I know of no one better qualified than Joe Kearney to lead that effort," stated PG&E Enterprises President and CEO Mason Willrich. Kearney most recently served as chairman and CEO of Coastal Power Production Corp. and vice president for ANR Pipeline Company. The new venture's first project is a 35-MW coal plant now under construction in Colstrip, MT.



Joseph P. Kearney

Iowa-Illinois Gas and Electric reorganizes

Iowa-Illinois Gas and Electric Co. has reorganized in order to separate responsibility for the operation of its gas and electric business. John Daniel, previously vice president-operation, was named vice president-gas and customer service operation. Stephen Shelton moved from his position as vice president-energy supply and engineering to serve as vice president-electric operation. "These changes generally will separate the gas and electric responsibilities for the energy planning and supply, engineering and Quad Cities distribution activities," stated Iowa-Illinois President Barry O'Brien.

Westinghouse names Bakos vice president

Frank R. Bakos, general manager of Westinghouse Electric Corp.'s Power Generation Business Unit, was made a vice president of the company. Bakos, 51, joined Westinghouse in 1956 and has held positions in purchasing, contract management, financial planning, sales and marketing.

Safety assessment conference to be held

An international conference on probabilistic safety assessment will be held in Pittsburgh on April 2-7. The conference, PSA '89, is expected to attract over 600 safety and regulatory experts from 25 countries. The American Nuclear Society will sponsor the conference, with grants from Westinghouse Electric Corp., the U.S. Nuclear Regulatory Commission, General Electric Co. and Duquesne Light Company.

Training in electrical measurement offered

Specialized courses in several areas of electrical measurements on power distribution and power apparatus are being offered by Biddle Instruments at its technical school in Blue Bell, PA. The following courses are available: DC Testing of Power Apparatus Insulation, April 10-13; Partial Discharge Detection in Insulation Systems, May 1-5 and June 19-23; Earth Resistance Testing, May 22-23; and Cable Fault Locating in Power Systems, March 27-30 and June 5-8. For more information write Biddle Technical School, Biddle Instruments, 510 Township Line Road, Blue Bell, PA 19422, or call (215) 646-9200.

INPO names NPPD to National Academy for Nuclear Training

The Nebraska Public Power District was granted membership in the National Academy for Nuclear Training by the Institute of Nuclear Power Operations. The honor is extended to utilities whose nuclear training programs meet the highest standards of the nuclear utility industry. According to NPPD, it is the 51st electric utility to be named to the academy.

DOE picks contractor for Super Collider

The Department of Energy said it has signed a contract with Universities Research Association Inc. (URA) to be the management and operating contractor for the Superconducting Super Collider facility, now named the Ronald Reagan Center for High Energy Physics. URA, a consortium of 66 universities, will establish a laboratory organization to manage and administer the design, construction and commissioning of the Super Collider, followed by an optional five-year term for an initial operating phase. DOE said it has requested \$250 million in the fiscal year 1990 budget for the Super Collider, including \$160 million for construction and \$90 million to continue research and development. The center, located in Ellis County, TX, will be directed by Roy Schwitters of the Harvard University Physics Department.

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Commission performance: a narrow path to walk

The difference between victory and defeat in battle is often some very small event or decision. In corporate decision-making, the question of whether an action will be legal or not often can be a fine line. So too in the art of regulating the actions and operations of electric utility organizations.

At best, regulators must walk a narrow path to provide adequate protection for the interests of ratepayers, while at the same time allowing sufficient fair return for utilities to ensure the power supply. All too often, however, that path is not clear enough, or regulators and staff may see their responsibilities in a different light. When that happens, one side or the other may find itself to have been disadvantaged, or wronged. And since most commissioners are either elected or appointed by the chief executive of the state, who is elected, pressures to act on behalf of consumers and ratepayers, regardless of the effect(s) on utilities, can be overpowering.

We were especially mindful of this seeming preference as we read through the opinion and interim order of the Michigan Public Utility Commission in the matter of the Midland Cogeneration Venture's application for approval of capacity charges contained in its contract with sister-organization, Consumers Power Co. A number of related cases—more than 40—were included and the entire matter of power supply requirements of Consumers Power, Public Utility Regulatory Policy Act of 1978, fuel use, rate effects, cogeneration and Qualifying Facility power was handled as a single, albeit complex consideration.

As discussed in the news story on page 1, the Commission has issued an interim order limiting the amount of power Consumers Power Co. can obtain from all external sources, as well as from the Midland Cogeneration Venture, specifying that not more than 55 percent can come from one facility and not more than 75 percent can be based on a single fuel.

On first reading, it appeared that the Commission had vastly overstepped its authority by injecting its own consumer-protective bias into the corporate decision-making process. But on further consideration, it appears that what may appear to be Commission bias is the result of the Commission trying to reduce the complexities of the entire Consumers power supply/state non-utility generation situation, as it now exists. At the same time, the Commission could fulfill its assigned responsibilities under PURPA rules. Moreover, by being switched out of the Consumers Power's rate base, and into a separate subsidiary, MCV no longer qualifies for utility consideration. It's just another "co-generator."

It is true that the Commission may have resorted to what industry planners might consider to be simplistic methods at times. Also, one might criticize the Commission for its tardy attention to the problems dealt with in its interim decision. Admittedly, the time to have approached the utility about its plans to take a given portion of capacity from Midland would have been fairer to all concerned had it taken place during initial discussions about converting the former nuclear plant-to-be. Also, admitted Commission-staff conservatism tends to understate utility needs.

But what the Commission has elected to do is leave its options...and those of CMS and its Consumers Power and Midland Cogeneration Venture...open while stimulating development of non-utility financed capacity. By limiting Consumers' use of Midland power, the Commission seeks to force development of other non-utility power sources, which can be brought on-line relatively quickly should additional power be needed earlier than predicted.

This ruling contrasts with the Maine Commission's ruling in the matter of new facilities to be developed to take greater advantage of Canadian power by Central Maine Power Co., discussed last month. There, the Commission really usurped the company's prerogatives in the face of previous economic success and broad public and industry support. The Michigan Commission's interim order, we believe, has been thoughtfully and honestly determined in hopes of temporarily disposing of a number of complex issues in such a way that neither consumers, the utility nor potential non-utility generators is treated unfairly.

The decision may not be perfect, from any viewpoint. It seems to be, however, an honest attempt to be fair to all, without prejudice, by leaving the door open for another consideration two or three years down line, or perhaps sooner if needed.

Robert A. Lincicome, Editor-in-Chief

Canadians favor nuclear power supply: CNA survey

MONTREAL—Canadians are positive about nuclear power generation, according to a recent survey. Nearly 80 percent called nuclear energy a good or realistic choice for large-scale use.

Nuclear energy provides 15 percent of Canada's needs, compared to about 20 percent in the United States. Ontario, however, fills half its demand with nuclear power.

The Decima survey, for the Canadian Nuclear Association, reached 1200 adult Canadians in November 1988. It is considered accurate within 2.9 percent, 95 percent of the time. The results were cited in the December issue of *Nuclear Canada*, a newsletter by the Canadian Nuclear Association (CNA).

76% call nuclear an important source

Sixty-four percent of Ontarians favor nuclear energy for generation, compared with 51 percent nationwide. In Ontario, 89 percent believe nuclear energy is an important source, compared with 76 percent for all of Canada.

Eighty-one percent of Canadians said nuclear energy will be an important future energy source; and more than 60 percent favored nuclear energy as one of the ways to generate electricity. Exactly 90 percent said they would like more information about the nuclear industry.

"The results of this poll show that we Canadians have a good understanding of the need for electricity in this country and the important part nuclear energy plays in meeting our needs today and for the future," according to Rita Dionne-Marsolais, CNA vice president of information.

\$4 billion Canadian nuclear industry

Canadian uranium mining creates annual export earnings of \$1 billion. Worldwide, about 85 percent of the Cobalt 60 radioisotope is provided by Canada. In total, the nation's nuclear industry is a \$4 billion-a-year business employing 100,000 people directly and indirectly, according to the Canadian Nuclear Association.

Canadian Attitudes Toward Nuclear Energy

	Canada	Atlantic	Quebec	Ontario	Prairies	British Columbia
Favor nuclear energy as one of the ways to generate electricity	81%	58%	56%	88%	60%	52%
Nuclear energy will be somewhat or very important as a future energy source	81%	84%	75%	82%	81%	67%
Nuclear energy is a "good" or "realistic" choice for large scale use	78%	80%	75%	83%	76%	68%
With continued economic growth there will be an increasing demand for electricity	87%	83%	87%	91%	88%	81%
Believe there is a lot of untapped water resources available for hydroelectric projects	18%	8%	25%	16%	9%	24%
Believe that coal has less environmental impact than nuclear energy	48%	61%	51%	44%	45%	47%
Agree that the nuclear industry is capable of handling its waste	34%	32%	36%	35%	31%	29%
Like to know a little more, something more, and a lot more about the nuclear industry	90%	90%	87%	90%	93%	93%

The survey randomly sampled 1200 adult Canadians, 18 years of age and older, by telephone from Nov. 25 to 27, 1988. Results are accurate within ± 2.9 percentage points, 95 percent of the time.

Source: Decima Research Survey November, 1988.

Railroad restructuring may slow coal shipping

WASHINGTON—Coal-fired utilities should invest in railroads to help guard against disruption of coal shipments from railroad restructuring—mergers, bankruptcies, line divestitures, consolidations and abandonments. So says a Utility Data Institute report.

"Since 1978, more than 42,000 miles of existing railroad line have been abandoned or consolidated through mergers and acquisitions, a reduction of about 22 percent," explained Charles H. Banks, report co-author, and staff member of R.L. Banks & Associates, a consulting firm.

"While the last five years have seen an unprecedented surge of new short-line and regional railroad-line development, major railroads will continue to consolidate traffic routing and eliminate surplus lines. Few coal-fired electric power plants or mines can expect to be immune from the effects of potential changes in ownership and operating practices of the component parts of their rail transportation supply network," Banks added.

Coal shipments represent 20-40 percent of railroad traffic volumes in the U.S. depending on the measure used. Electric utilities are the largest customer for this largest commodity hauled by Class I railroads, the report said.

A number of prudent actions

"We feel there are a number of prudent actions that coal shippers and customers can and should take to protect their long-term service, including major investment in railroad assets," said Walter H. Schuchmann, the co-author. "Almost 70 utilities and 10 coal suppliers now own or lease some 43,000 coal hopper and gondola cars for shipment of their plants' fuel supplies; a few utilities actually own railroads."

The report includes railroad restructuring activities, business development, implications for utility and coal industry managers and several case studies. For more information about the 50-page report call R.L. Banks & Associates at 202/296-6700 or UDI at 202/466-3660.

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

Peach Bottom restarts?

PE agrees to state oversight, new operation guidelines

PHILADELPHIA—Philadelphia Electric Co. officials expect approval for Peach Bottom restart mid-month, after an agreement allowing an unprecedented

expanded state oversight of the plant operations.

In return for the oversight, Pennsylvania agreed to withdraw challenges to certain license amendments for Peach Bottom that were filed before the NRC and Third U.S. Circuit Court of Appeals.

One PE spokesman said the agreement was "to reestablish the public's trust and confidence," and characterized it as unique to the Peach Bottom nuclear plant.

The plant—closed by the NRC in May 1987 because of operators sleeping at

the controls—has cost the company about \$200 million in replacement power and other costs.

Encouraging news on improvements

After reorganization of staff and procedures, and resignation of two officers, the company said it would wrap up technical details for restart by April 1. NRC Chairman Lando W. Zech Jr. toured the plant March 15 and was very favorably impressed, officials there said. Also, the Institute of Nuclear Power Operations, which previously scorched PE Peach Bottom operations, said in a letter the utility has been "responsive and effective" in meeting its concerns.

Stipulations of agreement

If the NRC approves the agreement with Pennsylvania, PE would:

- Allow the state access to confidential documents, including evaluation re-

Continued on page 13

LATE NEWS

The New Jersey Board of Public Utilities approved a credit of \$37.7 million for customers of Public Service Electric & Gas Co. and Atlantic City Electric Co. for the two-year shutdown of Peach Bottom. The credit assumes Unit 2 startup in May and Unit 3 startup in September. Further delays would lead to credits of \$5 million per plant per month, the BPU said. See related story below.

Illinois Power Co. anticipates a decision by March 31 on its rate-hike request related to its Clinton nuclear plant. What has been proposed by an Illinois Commerce Commission hearing examiner would have a "devastating" effect on the utility. See page 34.

PSNH's bankruptcy judge ordered all parties involved to reach a consensual reorganization plan by mid-May. See page 12.

WPL Holdings seeks to acquire MG&E for stock

MADISON, WI—WPL Holdings, the holding company formed by Wisconsin Power & Light Co., has announced that it has offered to acquire Madison Gas & Electric Co. The announcement was made by WPL Holdings chairman and chief executive officer James R. Underkofler.

An MG&E spokesman, Richard M. Lawrence, said the company on March 9 had received an offer to exchange 1.67 shares of WPL Holdings common stock for each share of MG&E stock in a tax-free transaction. MG&E Chairman and CEO Donald J. Helfrecht, said the company would study the proposal carefully and respond in due time.

Continued on page 13

Consumers Power follows interim PSC cogeneration order

JACKSON, MI—Consumers Power Co. told the Michigan Public Service Commission that it intends to comply with the recent interim order in the consolidated cogeneration case subject to satisfactory clarification of certain issues necessary to protect the interests of both the company's customers and shareholders (EL&P, March, p. 1).

The utility also said that it is preparing contracts with cogenerators and small power producers, consistent with the MPSC's interim order, on the assumption that clarifications requested by the utility will be satisfactorily resolved.

In its filing, Consumers Power asked the MPSC to clarify five issues concerning the utility's interpretation of the interim order. Further, the utility asked for a rehearing on six additional issues if Consumers Power's interpretation of the first five issues does not meet the MPSC's approval.

Issues that need to be clarified include questions on the methodology for rate backloading, the utility's prudency risk, dispatchability terms, limitations beyond the present order on project size and fuel type, and use of the coal proxy for future electric capacity additions.

"Consumers Power is striving to make the interim order acceptable to its customers, shareholder and the community of Qualified Facility (QF) developers," the utility's filing said.

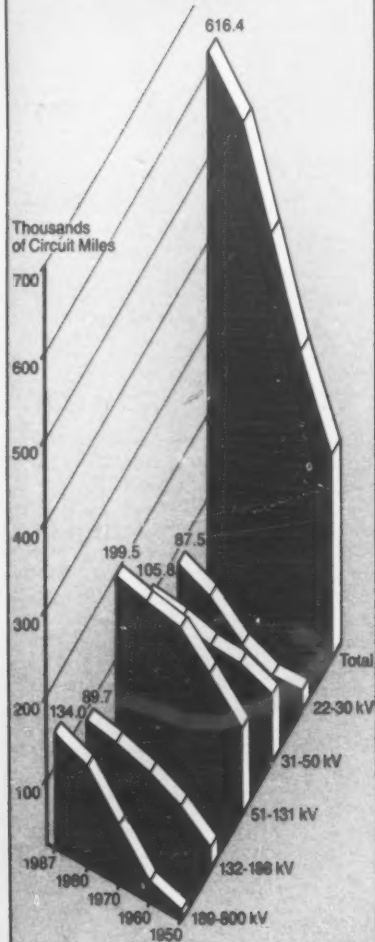
"If the MPSC can clarify outstanding issues in a satisfactory manner, the result will be a product that should encourage adequate QF

city to meet the consumers' electric needs at a fair price to all concerned."

Consumers Power is a principal subsidiary of MS Energy Corp.

CIRCUIT MILES OF OVERHEAD ELECTRIC LINE OF 22,000 VOLTS AND ABOVE*

Total Electric Utility Industry



Source: 1988 ESI Pocketbook of Electric Utility Industry Statistics.

* Alaska included since 1981; Hawaii since 1986. Lines operated by REA cooperatives are excluded.

Shoreham decision is likely

HICKSVILLE, NY—Mid-April is when the world may learn if \$5.5 billion Shoreham nuclear plant will operate or be sold for one dollar to the state for decommissioning.

It also may be when the ratepayers and shareholders find out how much more the plant's going to cost them.

If the LILCo board approves state regulators' rate-hike/shutdown package April 15, shareholders would vote by proxy about mid-June.

Whether or not the plant operates, the company seems due for substantive rate increases. Fear about the ability to evacuate the island has entangled plant

and owner Long Island Lighting Co. since long before the 1985 low-power license.

Here's how things stacked mid-March in this continuing saga.

New deal, same idea

Gov. Mario Cuomo proposed another shutdown plan Feb. 28, much the same as he proposed in June (EL&P, May, p. 1). The new plan, however, did not require legislative approval and left rate-making to the Public Service Commission. The legislature wouldn't approve the June plan because of the rate

Continued on page 12



Years of controversy about LILCo's \$5.5-billion Shoreham plant may be close to resolution.

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EIA says utility gas use may double by 2000

The United States may double its use of natural gas for electricity generation by the year 2000, according to a report by the Energy Information Administration. In its report, prepared for the House Committee on Energy and Commerce, EIA predicts that one-third of the growth in consumption will probably occur in generating units already in service, but not currently used to capacity. If gas-burning plants were retired by the end of their 30-year economic lives, or if they were converted to other fuels, economically recoverable gas would be adequate to meet consumption for electricity through the year 2030, the study revealed. However, EIA said that if the plants were not phased out additional gas resources would have to be produced beyond what is now considered economic to recover.

NEP picks gas pipelines

New England Power Co. (NEP) has chosen five interstate pipeline companies to transport natural gas from Canadian and domestic sources to its Brayton Point and Manchester Street generating stations. The company said it is acquiring the gas transportation in order to provide enough fuel for the increased demand for electricity in the New England region, and to comply with new environmental requirements in Massachusetts. "We believe that the five pipelines that NEP has selected will provide the company with economic and reliable routes for long-term supply of natural gas," stated NEP President John F. Kaslow. The five companies chosen are: Algonquin Gas Transmission Co.; Champlain Pipeline Co.;

Tennessee Gas Pipeline Co.; ANR Pipeline Co.; and Columbia Gas Transmission in Ohio. The Canadian sources supplying natural gas to NEP include: Triton Canada Resources; Sceptre Resources Limited; BP Resources Canada Limited; and Renaissance Energy Ltd.

Vogtle-2 to begin low-power testing

The Nuclear Regulatory Commission Office of Nuclear Reactor Regulation granted a license to Georgia Power Co. for fuel loading and low-power testing at Unit 2 of its Vogtle nuclear plant. The license allows testing of up to five percent of full power, according to the commission.

Idaho Power involved in rebuilding projects

Idaho Power said it has reached an agreement in principle with the Twin Falls Canal Co. and the Northside Canal Co. on joint participation in the Milner Dam project. The companies plan to rebuild the 85-year-old dam and develop a hydroelectric project nearby. Under the agreement, the canal companies will receive funds from Idaho Power for reconstruction of the dam, and will repay the utility when the hydroelectric project is completed. A 44-MW power plant, to be built downstream from the dam, will be used to make falling water and royalty payments to the canal companies, according to Idaho Power. Reconstruction of the dam is scheduled to begin this October and finish in January 1991. An October 1990 starting date is planned for construction of the hydroelectric project, with completion expected in two years.

In related news, Idaho Power has asked the Federal Energy Regulatory Commission to approve the rebuilding of its Swan Falls powerhouse, the utility's oldest hydroelectric plant. The company said a recent study shows the structure must be rebuilt within the next five years to maintain safety and operational standards.

Rhodes is president, CEO at Virginia Power

James T. Rhodes became president and chief executive officer of Virginia Power on April 1, succeeding Jack H. Ferguson who has retired. In his 18-year career with the utility, Rhodes most recently served as senior vice president-finance.

Reilly to head EPA, support grows for agency status change

The Environmental Protection Agency has named William Reilly to replace Lee M. Thomas as administrator. Reilly is an environmentalist and former president of both The Conservation Foundation and the U.S. World Wildlife Fund.

In other news, the issue of raising EPA to a cabinet-level department is gaining support in both houses, according to the American Consulting Engineers Council. A bipartisan group of legislators plans to introduce the measure.

B&W nuclear fuel assembly achieves record at Oconee-1

B&W Fuel Co. announced that its Mark-B nuclear fuel assembly at Duke Power Co.'s Oconee Unit 1 has reached a record assembly-average burnup of 58,310 MWd/mtU. The previ-

ous record for a commercial light water reactor fuel assembly was set in 1988 by another B&W Fuel Co. assembly at Arkansas Power & Light Co., according to the company. B&W Fuel Co. is a partnership formed between Babcock & Wilcox and a French consortium of Cogema, Framatome, and Uranium Pechiney.

Mitsubishi Elec. buys WM Power Products

Mitsubishi Electric America, Inc. has acquired Westinghouse Electric Corp.'s WM Power Products, Inc., previously a joint venture of the two companies. WM Power Products supplies electrical transmission and distribution equipment, including power circuit breakers and gas-insulated substations, to the electric utility and industrial markets. Mitsubishi said a new office and manufacturing facility will be constructed in Pennsylvania for the company, which is currently located in Pittsburgh. WM Power Products' existing team will continue to manage its business in the United States and Canada, according to Mitsubishi.

IEEE passes 300,000 mark in membership

The Institute of Electrical and Electronics Engineers reported that it now has more than 300,000 members, over twice the size of the next largest engineering society. "Since the formation of the IEEE in 1963 from the merger of the American Institute of Electrical Engineers and the Institute of Radio Engineers, IEEE membership has grown from 154,000 to the present level, effectively doubling during the past 25 years. During this time, the Institute has added almost 146,000 new members to its rolls..." stated IEEE President Russell C. Drew. Members of the New York-based IEEE are involved in advancing the theory and practice of electrical, electronics and computer engineering, computer science and related arts and sciences.

NUS opens school for T&D instructors

NUS Training Corp. (NUSTC) has opened a school for transmission & distribution instructors, and will conduct its first 3-day session on April 18-20 in Gaithersburg, MD. The session, on distribution instruction, will show T&D instructors how to use NUSTC videotapes in their training environment, how to enhance presentation skills, and how to take full advantage of the training process. Subsequent sessions will deal with substation/switchyard and transmission instruction. NUSTC said its instructors school can also be brought onsite. For more information contact Sue Grove-

Apple at 1-800-848-1717 or Mike Haley at 301-258-1891.

Rybel wins award for dewatering plan

The American Society of Civil Engineers has given its Thomas Fitch Rowland Prize to Vincent W. Rybel for his contributions to construction management and construction engineering. Rybel, a geotechnical engineer at CH2M-Hill Northwest, Inc., co-authored a paper describing a dewatering plan he helped to devise for the excavation of the Opal Springs Hydroelectric Project in Oregon.

Utility bills can soon be paid at 7-Eleven stores

Utility customers in 18 states will soon be able to pay their monthly bills at local 7-Eleven stores, according to the National Payments Network (NPN). A contract signed between NPN and The Southland Corporation of Dallas, operator and franchisor of 7-Eleven, allows NPN to install computer terminals in participating stores. Bill payments in the form of cash, check or money order will be accepted by store personnel who will then transfer the funds to the utility via the computer. "We believe offering our customers an opportunity to pay their utility bills is a great service for anyone who is in a hurry," said Southland Senior Product Manager Keith Jenkins. "And, customers who don't have checking accounts can simply bring cash. We offer the kind of flexibility that should make this program very attractive to everyone," he added.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:

Detroit Edison Co.
A \$50,000 fine for violations of NRC safety requirements involving motor-operated valves at the company's Fermi nuclear power plant.

Duke Power Co.
A \$37,500 fine for alleged violation of NRC requirements at the McGuire nuclear plant.

Florida Power & Light Co.
A \$100,000 civil penalty for alleged violation of NRC security requirements at the Turkey Point nuclear power plant.

GPU Nuclear Corp.
A \$50,000 fine for an alleged violation of an NRC operating license safety limit and for numerous violations of standard maintenance procedures at the Oyster Creek nuclear plant.

Wolf Creek Nuclear Operating Corp.
A \$50,000 fine for allegedly violating NRC requirements in the operation of the Wolf Creek nuclear power plant.

Maine Yankee Atomic Power Co.
A \$75,000 fine for several violations of NRC security requirements at its Maine Yankee Power Station.

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PacifiCorp's Gleason: merger was 'smoothest ever'

CHICAGO—The recent PacifiCorp/Utah Power & Light Co. combination was "perhaps the smoothest merger ever—certainly the best utility merger," PacifiCorp President Al Gleason told utility analysts recently.

An expanded and more flexible transmission system, broader customer base, larger capacity margins and efficiency savings "will make us a formidable cost-based force in the West," Gleason said at a meeting of the Utility and Telecommunications Securities Club of Chicago.

He repeated the savings of the merger, often-cited during the 17-months of proceedings: \$50 million the first year, \$500 million over five years and \$160 million a year within five years. About 900 employees will be trimmed by attrition (EL&P, February, p.1).

Benefits already

Some benefits are already apparent. During the recent "Siberian Express" that stressed the Western grid, PacifiCorp made spot power purchases through the Utah system from Arizona and New Mexico utilities. Subsequent sales in California translated into "very pleasing news for the first-quarter" financial report, Gleason predicted.

He doesn't subscribe to any mass consolidation theories. Many advantages of the merger are specific and would not lead to a multitude of utility mergers, he said.

Transmission from Pacific Power & Light Co. is primarily east-west, while UP&L is mostly north-south, making the combination a dynamic intertie network, Gleason pointed out. The

FERC transmission guidelines will have very small net effect on profitability of the merger. Vice President Rod Boucher stressed.

In fact, selling transmission capacity could be greater than what was outlined in the merger, Boucher said. The trend toward more access is actually healthy for low-cost producers like PacifiCorp, he explained.

With unrestrained excitement, he said: "We made a lot of money last year; this year, we'll make even more!"

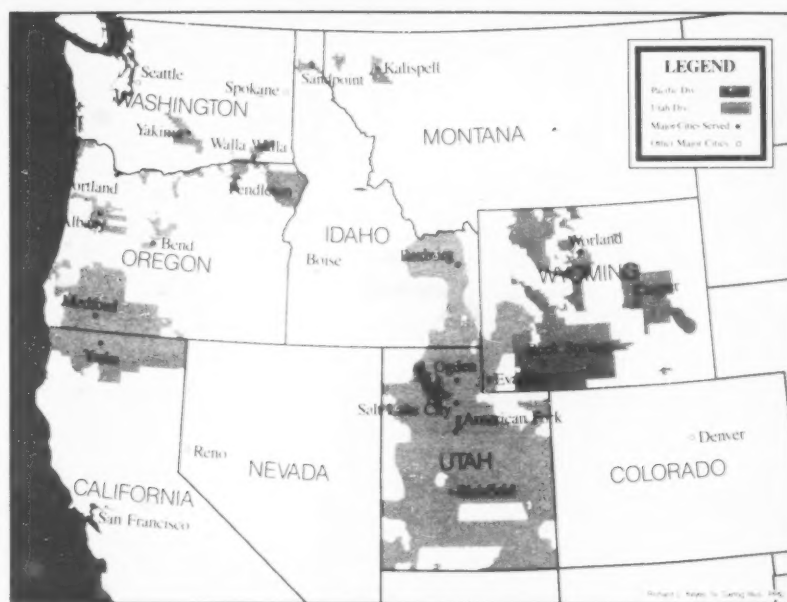
Year-end figures

PacifiCorp net fourth-quarter income was \$447 million, up from \$411 million in 1987. Earnings per share were \$3.46, up 9 percent, despite a decline in EPS in the fourth quarter. Not including the merger, year-end EPS results were \$3.85 compared to \$3.60.

Together, the revenues from the electric divisions were up 4 percent to \$2.2 billion as kilowatthour sales increased 5 percent to 46 billion. Retail sales increased 6 percent; industrial customers accounted for the largest increase. Sales to other utilities were up 3 percent to over 8 billion kWh while revenue from this sector was 24 percent higher.

Pacific Power contribution to net fourth-quarter income was \$49.2 million, down slightly from \$51.0 million last year. The contribution to net year-end income was \$169.2 million, up from \$168.8 million.

Utah Power & Light net fourth-quarter income was \$35.0 million, down from \$39.8 million. The net year-end income was \$160.6 million, up from \$144.8 million.



1988 a record year for combustion of turbines

ALBANY, NY—Combustion-turbine plant performance hit record highs in 1988 according to a recent report published by Strategic Power Systems Inc.

Plant availability was up 4 percent over 1987 to 93.2 percent, while plant reliability increased 4 percent over 1987, to 99.2 percent in 1988. Service factor for combustion turbine plants also improved in 1988 to 33.2 percent, as compared to 30.3 percent in 1987.

SPS was founded in 1987 by former employees of General Electric Corp.'s gas turbine department and Digital Equipment Corp. The combustion turbine performance reporting program was initiated by GE in 1977 and was turned over to SPS, under an EPRI grant initially, in 1987.

The 1988 Year-End Report was generated from a combustion turbine operational and maintenance reporting system that contains over 1600 turbine years of operation and maintenance detail. The Operational Reliability Analysis Program data is segmented by turbine application and duty, allowing detailed comparisons. The table following represents the pooled results for all units above 50 MW, including utility, industrial and cogenerator plants.

The report shows that the Planned Outage Factor was highly variable, depending on plant duty and application. Peaking plants had an average Planned Outage Factor of 6.3 percent over the period 1977 to 1988. Cycling plants had an average of 11.4 percent over the same period, while baseload plants had an average of 11.6 percent. Continuous duty plants had an average Planned Outage Factor of 3.5 percent during the period 1985 to 1988. Data is not available prior to these years.

The report also shows that the Forced Outage Factor (FOF) remained fairly

steady over the period 1977 to 1988, independent of plant duty and application. Peaking plant (FOF) averaged 5.2 percent for the period; cycling duty plants averaged 4.6 percent; and baseload plant averaged 5.0 percent. The best FOF was exhibited by continuous duty plants, which averaged 1.1 percent Forced Outage Factor for a shorter 1985-1988 period. The maximum difference in these FOFs represents 358 hours per year of forced unavailability.

Starting reliability

Plant Starting Reliability for the period 1977 to 1988 ranged from 91.4 percent in 1977 to 96.2 percent in 1988. Peaking-duty units had a starting reliability of 94.4 percent during the period, while starting reliability was 93.8 percent for cycling duty plants and 91.3 percent for baseload plants. Continuous duty plants averaged 84.6 percent for the period 1985 to 1988.

Critical factor

"Overall, these trends show that combustion turbines can provide equivalent levels of performance as traditional baseload steam units," says Salvatore DellaVila, President of Strategic Power Systems. "This will be a critical factor in the years ahead as combustion turbines represent an increasing portion of the utilities' generation capacity."

Expansion

Strategic Power Systems is expanding its reporting to jet derivatives and a cross-section of turbine and equipment manufacturers. It also is working with the North American Electric Reliability Council to see if the same analytical system could be extended to broader performance data reported to NERC by electric utility organizations.

Plant performance comparisons				
Parameter	'88 Result	'83-'88 Avg	'82 Result	'77-'82 Avg
Availability	93.2	89.0	84.0	83.4
Reliability	99.2	96.4	95.0	93.7
Starting reliability	96.2	95.1	94.4	92.8
Service factor	33.2	28.3	17.5	17.7
Forced outage factor	0.8	3.6	5.0	6.3
Planned outage factor	6.0	7.4	11.0	10.3
Fired hours per start	33.8	31.4	33.8	23.5

Canadian electrical exports fell in '88

MONTREAL—Exports of electricity to the U.S. from Canada fell 28 percent in 1988, the Canadian National Energy Board has reported to the Canadian Electrical Association.

The reduction is the result of strong domestic demand in Canada and the drought that reduced hydro output.

Other provinces that suffered reductions in electrical exports and the revenues they produce were New Brunswick, Ontario, British Columbia and Saskatchewan. Strong domestic demand, the result of Canada's economic recovery, and drought were instrumental in all cases, CEA said.

Canadian Exports to the U.S.

Province	1988	1987	% ±
Quebec	11,863GWh	16,401GWh	-27.7
British Columbia	8,851GWh	12,815GWh	-30.9
Ontario	7,438GWh	8,497GWh	-12.46
New Brunswick	5,191GWh	6,141GWh	-15.5
Manitoba	629GWh	3,461GWh	-81.8
Saskatchewan	57GWh	113GWh	-49.7
Total Canada	34,029GWh	47,427GWh	-28.3

Revenues from exports dropped 29 percent, from \$1.2 billion in 1987 to \$855 million last year. According to CEA, this is the first time since 1980 that revenues have slipped below \$1.0 billion.

Canadian exports in 1988 were 34,029 GWh, down from 47,427 GWh a year earlier.

Manitoba big loser

The largest drop in export volume occurred in Manitoba, where a two-year drought has severely reduced water levels in impoundments behind hydro dams. Manitoba kilowatthour exports fell by 82 percent, while revenues tumbled 69 percent.

Quebec

Quebec, Canada's largest exporter of power to the U.S., exported 28 percent fewer kilowatthours of electricity in 1988 than a year earlier, which caused a revenue drop of 22 percent.

DOE awards \$90-million contract for new N-design

SAN FRANCISCO—The Department of Energy awarded GE's Advanced Nuclear Technology Operation a three-year base contract for \$46.7 million for an advanced conceptual design of a Liquid Metal Reactor (LMR) power plant.

The contract also allows for a two-year, \$44.4-million option for preliminary design.

Efforts will focus on developing an economical, safe, and environmentally acceptable modular plant design, resolving licensing issues with the Nuclear Regulatory Commission and developing private-sector support to continue the detailed design and construction phases of the program.

Continued on page 6

The 1989 IEEE/PES T&D Expo: A look at tomorrow

As this April issue of *EL&P* is delivered to subscribers, many engineers and managers of the industry's transmission and distribution systems will be gathering in New Orleans for the opening of the Institute of Electrical and Electronic Engineers' 11th Transmission and Distribution Conference and Exposition. The gathering, sponsored by IEEE's Power Engineering Society, will be the biggest and most comprehensive yet.

It also promises to be the most important in the 25-yr history of the event. As many as 14,000 are expected to attend the Conference, which will be launched with a keynote session that will define emerging trends and outline some of the major concerns facing the electric utility industry in the next decade. Registrants will be able to participate in more than 125 technical presentations, a tutorial, 28 panel discussions and special programs focusing on the opportunities (and problems) that will confront T&D engineers in the future.

Then they will have the opportunity to see the largest collection of new T&D equipment ever assembled. As of *EL&P* presstime, more than 418 manufacturers had signed up for more than 159,000 square feet of exhibit space. By opening day, April 3, those numbers should increase even more. Utility and architect/engineering participants will be able to see and discuss with supplier personnel the features and applications of more new products, equipment and systems than ever before.

There is no question, this event is the premier technical gathering for T&D people. It is especially important this year because of the increasing construction and maintenance activity going on today and the growing emphasis on improving productivity in system operations. The concentration of brainpower and experience focusing on real-world solutions to pressing technical problems, provided against the backdrop of new apparatus and equipment displays, offers unequalled opportunity to develop new insights into ways to cope with the challenges of the both today and tomorrow.

Some have questioned the frequency of the Conference and Exposition. Two-and-a-half years is an unusual time between major meetings. But such an interval allows for the initiation and completion of projects based on technologies and products introduced at one show, with the results to be reported at the next one. It allows adequate time for development and financing of product development by suppliers. Moreover, the frequency allows for spring and fall dates, which allows more open selection of location without the same weather constraints. In other words, it all works...and works well for all participants.

EL&P invites its reader-visitors to the T&D Conference and Exposition to stop by Booth 415 to chat with its editors. We'd like to talk with you, get your thoughts about the meeting and about anything else you'd like to discuss. But if you can't be in New Orleans, we'll report on the event in the May and June issues so you'll at least get some of the flavor.

It's true, the IEEE/PES T&D Conference and Exposition isn't held often. But it's really worth the wait.

Will one-stop licensing change the industry's nuclear future?

The probability of the Nuclear Regulatory Commission adopting new procedures providing for so-called "one-stop licensing" offers utilities hope that the nuclear option may be restored. But the process, which means that an operating license would go along with permission to construct a nuclear plant, is only a facilitating procedure. It would allow a utility to develop a time-sequence for operation, assuming construction and training meet constant inspection criteria, without the horrendous delays currently taken up by hearings and court challenges and attendant skyrocketing costs. But one-stop licensing won't change public perceptions of the dangers of nuclear power. And without changes in those perceptions, no utility is about to try to exercise its nuclear options.

Robert A. Lincicome, Editor-in-Chief

The arrogance of power

I like Charles Osgood. Many other people like this well-known and charming radio and print personality. In fact, it might be safe to say that of those that listen to him or read his columns, practically all like him.

But Charles Osgood and his parent radio organization, CBS News (and especially a minor functionary in that organization), may be just a bit overwhelmed by their own importance...as some people and organizations in our industry may have been, and may still be.

Osgood recently gave one of his commentaries that was directly related to the energy industry. It referred to a report from the National Oceanic & Atmospheric Administration that threw cold water onto all the recent hysteria about the onset of the so-called Greenhouse Effect. Not only did he comment on the Effect and the report, Osgood followed up with one of his clever and witty poems that so aptly put things into perspective.

We would have loved to reprint that poem, so you, our readers, could have shared in his funny insights. In point of fact, we made a valiant effort to do so. CBS News even graciously and swiftly answered our request, and rushed us a copy of the piece.

However, a warning on the copy stated, "No portion of it [the broadcast] may be broadcast, published, or reproduced in any form without the written permission of the CBS NEWS ARCHIVIST." (Their capitals, not ours.)

We had no problem with this requirement, so we immediately got on the phone and tried to contact this CBS NEWS ARCHIVIST, and ran into a wall. We were told that this important person was "not available at this time." So we left a message requesting that he please return the call.

After waiting a day, we called again. Same result. And again. And again. And then we faxed our request to him.

How many times have plain citizens or local media representatives ever called their electric utility, trying to find out some basic information about services or policies? And how many times have they been frustrated in these attempts?

In the northern Illinois area, one we are most familiar with, both citizens and media have run into problems in this respect in the past. The utility here often only spoke directly on certain broad and some specific issues with the public utilities commission, and not with anyone else. Many other electric utilities, in the past, acted the same way. The exclusive utility-commission connection was a cozy relationship that had worked for decades, so why change it?

In recent years, as rates have gone up, and up, and up again—whether reasonably or not—electric utilities have found that they darn well better start talking to private citizens and citizen's groups and the media.

Our 1988 Utility of the Year, General Public Utilities Corp., when asked what was the one most important lesson they learned from the accident at Three Mile Island, didn't hesitate to bypass every technical consideration and say that it was to *keep the public informed!*

Apparently, CBS News and its parent, the CBS network, may not yet have learned this valuable lesson.

CBS even virtually ignored one of its most valuable stars and shows, Angela Lansbury and "Murder, She Wrote," until almost too late, noted an article in *The Wall Street Journal*. (Somebody probably didn't return her calls, either.) When she expressed her frustration and intention of leaving at the end of the season when her contract ran out, the network suddenly found reasons to talk with her.

And all three of the major networks, not just CBS, have lost viewers, admits Howard Stringer, president of CBS Broadcast Group, because of poor programming. Maybe from not returning media and viewer phone calls, and thus missing out on valuable feedback.

Can we, in our own very public business, learn something about the value of answering inquiries with interest on our part? Perhaps.

Should we learn this lesson? You bet!

Henry Stein, Engineering Editor

CMP signs residential conservation pact

AUGUSTA, ME—Central Maine Power Co. signed a five-year, 6.5-MW, \$5.1-million bid contract for conservation improvements in what is believed to be the largest residential "megawatt" purchase, covering 10,300 households.

SESCO Inc. of Springfield, MA, is to implement the 25-million kWh in conservation improvements.

The CMP-SESCO contract is the fifth major performance conservation bid project signed by CMP's 1988 "all-source" solicitation, touted as the nation's first.

To date, 12 utilities in New Jersey, New Jersey and Vermont have submitted their own plans to conduct similar solicitations, CMP said. The Massachusetts Department of Public Utilities recently ordered all state utilities to evaluate and undertake such a process.

Under these performance bid contracts, utilities can purchase metered conserved energy and capacity (megawatts) at a price at or below the prices they would have to pay for the

same energy and capacity from another utility, from outside power producers or from their own construction activities. Since utilities pay only for measured results and always at a price below their avoided costs, the programs are guaranteed to be cost-effective for the utility and ratepayers, CMP explained.

Bills cut by \$2500 each

Over the life of the improvements, participants are expected to reduce their utility bills by \$26.1 million in 1989 dollars, an average of \$2500 each.

Savings will be measured at each CMP residence based upon before-and-after meter readings. Results are adjusted for weather, vacancies, changes in facility use, participation in other utility conservation programs, savings deterioration and natural conservation due to price increases. SESCO bears the cost of measurements (subject to CMP approval), inspections and installations.

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Fossil plant costs down; nuclears are up

WASHINGTON—Variable production costs at U.S. fossil power plants declined or remained stable during the period 1983-87, but those at the country's nuclear power plants went up, noted a five-year cost report from Utility Data Institute (UDI).

The report contains data for 580 power plants filed by utilities with various federal agencies over the five-year period noted.

Numbers don't lie

During the five years, average variable costs per net megawatthour declined for coal-, oil- and gas-fired plants—primarily, it must be noted, due to fuel price decreases. Costs at coal plants went from \$22.38/MWh down to \$20.74/MWh. Gas plant costs went from \$41.67/MWh to \$28.94/MWh, and oil plants, from \$52.70 to \$37.43.

However, the average variable net cost of electricity produced by nuclear plants increased 35 percent over the same five years, from \$16.14/MWh to \$21.78. Note that, in spite of the increase, low fuel costs helped the nuclears retain their cost advantage in UDI's rankings of the top 100 plants with the lowest average variable production cost per net megawatthour of electricity produced.

Top 20 breakdown

Of the top 20 ranked by this cost criterion, seven were coal-fired, one gas-fired and 12 nuclear. Still in UDI's No. 1

Type Plant	Average Variable Plant Costs				
	1987	1986	1985	1984	1983
Coal Plants	20.74	21.61	22.58	22.34	22.38
Gas Plants	28.94	30.43	42.33	42.98	41.67
Oil Plants	37.43	33.99	52.82	55.26	52.70
Nuclear Plants	21.78	20.40	18.76	18.58	16.14

Lowest-cost Plants				
Rk	\$/MWh	Plant	Fuel	Cap'y
1	4.58	Rio Pecos	Gas	142
2	11.08	Young	Coal	673
3	11.23	Prairie Isl.	Ur	1186
4	11.31	North Anna	Ur	1958
5	11.88	Laramie Riv.	Coal	1710
6	11.46	Nine Mile	Ur	642
7	11.91	Zion	Ur	2196
8	11.95	Calvert Cliffs	Ur	1829
9	12.60	Maine	Ur	864
10	13.10	Big Brown	Coal	1187

spot was Rio Pecos, a 142-MW gas-fired plant in Texas with a five-year average rate of \$4.58 per net megawatthour of electricity.

The components of the variable costs studied by UDI included fuel and operating expenses. Fixed expenses were not reported nationwide on a plant basis, so were not part of the analysis.

High-cost Plants				
Rk	\$/MWh	Plant	Fuel	Cap'y
91	18.38	Cumberland	Coal	2600
92	18.38	Naughton	Coal	707
93	18.43	Turkey Pt.	Ur	1520
94	18.50	Johnstonville	Coal	1485
95	18.50	Coleman	Coal	480
96	18.53	Rush Island	Coal	1110
97	18.55	Paradise	Coal	2558
98	18.60	Muskingum	Coal	1530
99	18.63	Louis	Coal	733
100	18.65	E.W. Stout	Coal	852

These fixed expenses included depreciation, taxes, insurance, etc.

Come and get it

The report, *U.S. Steam-Electric Plants: Five-Year Production Costs 1983-1987*, is available for \$395 from: Utility Data Institute, 1700 K St., NW, Suite 400, Washington, DC 20006.

Cogeneration project combines economics and environmentalals

JOHNSTOWN, PA—A \$110-million cogeneration project to be built in Ebensburg, PA, will be fueled by waste coal. The project includes development, design, construction and operation of a 52-MW cogeneration plant to burn bituminous waste coal in a Babcock & Wilcox-supplied, circulating fluidized-bed (CFB) boiler.

Where production goes

Electricity from the plant will be sold to Pennsylvania Electric Co. (Penelec), and the steam will be sold to the Ebensburg Center State School and Hospital, and to other businesses in the Cambria County Industrial Park.

Where supplies come from

The waste coal will come from piles already stacked throughout the state. It is composed of refuse derived from spoils or reject material deposited from coal mining and processing operations. Approximately 10.5-million tons of it are scattered in the state.

The CFB boiler can burn the low-quality, high-sulfur coal refuse efficiently in an environmentally acceptable manner by using limestone as a sorbent to capture-sulfur within the combustor.

Where ash goes

Ash from the plant will be put back into the coal refuse piles to aid in reclamation. Ash will be placed in alternate layers with the coarse, noncombustible leftovers. The ash will fill the pores of the coarse refuse to prevent refuse pile fires. The ash also will neutralize the acidic refuse to prevent acid drainage, and will make for a high compaction ra-

tio that will minimize pile permeability.

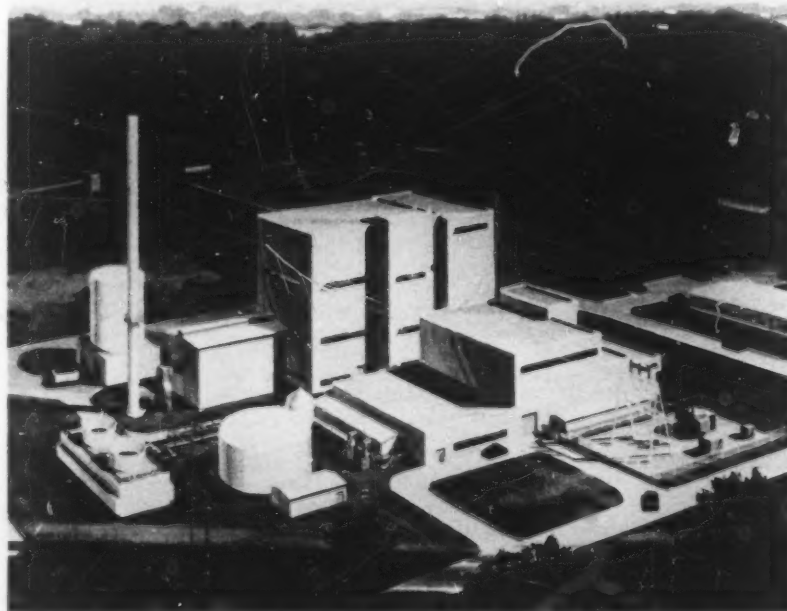
Project construction is scheduled to begin in the spring, and startup is scheduled in early 1990.

Who's involved

Project developer is Babcock & Wilcox, and owner is Ebensburg Power Co., a Pennsylvania general partnership of B&W subsidiaries. Turnkey contractor is United Engineers & Constructors Inc. Project operator will be

Power Systems Inc., another subsidiary of B&W.

Financing includes \$82 million in tax-exempt support obtained through the Pennsylvania Energy Development Authority—PEDA issued \$77.6 million in revenue bonds. Supplemental financing of \$4.4 million was approved by the PEDA Board in October 1988. Swiss Bank Corp. is the agent bank acting as credit facility provider and Mellon Bank is the financial trustee.



Artist's rendering shows how the Ebensburg Cogeneration Project will look when it has been completed in western Pennsylvania and starts burning coal.

WMECO gets bids for 381 MW from cogens & IPPs

WEST SPRINGFIELD, MA—Eleven bids, representing 381 MW of capacity, were submitted to Western Massachusetts Electric Co. in February in answer to the utility's first solicitation for cogeneration and small-power production supplies.

Size ranges, fuels

Proposed projects ranged from 12 MW to 55 MW in size. Five of the proposals, totalling 263 MW, were to be fueled by natural gas. The other six, with a combined capacity of 118 MW, were to be powered by wood, coal or refuse.

The proposals were in answer to WMECO's October announcement that it was looking for 54 MW of additional capacity from cogenerators and independent-power producers (IPPs). WMECO opened the bids Feb. 3.

Evaluation factors

Five of the projects, representing 61 percent of the capacity offered, are located within WMECO's 59-town service territory. The other six are outside the territory but still in New England.

Bids were to be evaluated on the basis of price, fuel type, size, technology, location compatibility with existing WMECO system, and financial viability and security.

The utility expected to narrow down the 11 projects to a preliminary award group by early March. Final selections will be made later in the spring. All of the selected projects will be offered standard long-term contracts and are to be operational by 1994.

CG&E studies SO2 removal

CINCINNATI—Cincinnati Gas & Electric Co. got a \$2.5-million grant from the Ohio Coal Development Office to help fund a pilot project to study advanced methods for removing sulfur dioxide from coal plant stack gases. The study will be conducted at CG&E's Miami Fort Station in North Bend, OH, and is expected to cost a total of \$6.6 million.

More money from...

The balance of the funding is coming from the Dravo Lime Co. (\$3.8 million) and the utility itself (\$300,000).

The pilot plant is to be built next to Miami's Unit 7, which will supply flue gases from its discharge duct ahead of the stack.

The plant will use thiosorbic lime in a wet flue-gas desulfurization (FGD) process that is similar to that used at CG&E's East Bend Station.

Process goals

But CG&E is aiming for this process to cost 30-percent less to build and to use 50-percent less land space than similar FGD systems.

Some of the other objectives of the pilot plant study include investigation of removing nitrogen oxides with the process and developing alternative ways to dispose of FGD waste products.

Construction is scheduled to begin early this year and testing to start in August. Completion of testing is scheduled for August 1990.

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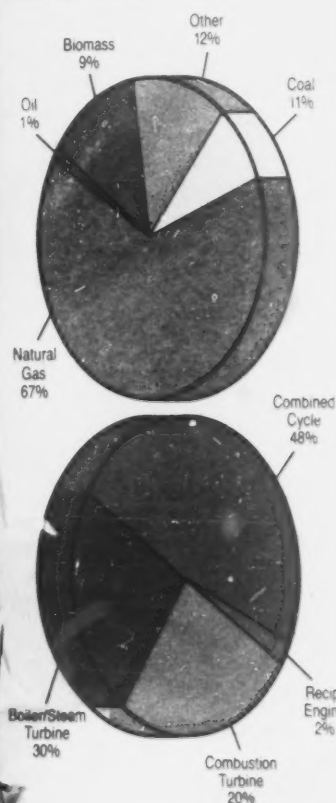
VOICE OF THE ELECTRIC UTILITY INDUSTRY

Top 100

24th annual report
starts on page 13

COGENERATION CAPACITY ADDITIONS 1980-1987 (11,827 MW total)

Cogenerators added a total of 11,827 MW to the electricity available in this country in the time period of 1980-87, said Bruce A. Hedman, asst. director, power generation, Gas Research Institute, at the Energy Technology Conference held in Washington, DC, Feb. 28-Mar. 2. The breakdown he gave of the sources of that energy are shown in the two pie charts below.



'88 was a better year for Top 100

BARRINGTON, IL—The nation's Top 100 Electric Utilities—the largest investor-owned electric companies in the country—rebounded in 1988 after a difficult year in 1987. Kilowatt-hour sales and revenues increased substantially. Earnings per share, which fell in 1987, were up in 1988, even though total net income for the companies fell.

These are the major conclusions reported in *Electric Light & Power's* 24th Annual Top 100 Electric Utilities Report, which begins on page 13.

Kilowatt-hour sales gained 5.3 percent during 1988, to 2.18 trillion kWh. Leading the gain were commercial/small light and power customer sales, which increased 6.1 percent.

Revenues, which also include returns from diversified activities of holding companies and companies that act similarly, climbed 4.8 percent. Revenues

from electric operations only were up 4.5 percent on the strength of the kWh sales increase.

Net income from all operations hit \$14.4 billion in 1988, a decline of 7.4 percent from 1987. Net incomes suffered from disallowances of construction investments in abandoned facilities and from reduced Allowances for Funds Used During Construction, which held down the size of positive gains. At the same time, several utilities suffered large losses, which pulled total net income change down in the negative range.

Despite this, earnings per share increased to \$2.44 from \$2.10 in 1987.

Net plant increased by 1.5 percent, to \$354.8 billion, while long-term debt grew 1.4 percent to \$158.7 billion.

The number of electric customers grew 1.8 percent, to 80.7 million.

LATE NEWS

The NRC granted Seabrook low-power testing after a court rejected a stay on May 25.

WPL Holdings raised its stock offer to 1.75 shares. See below.

Bechtel and B&W expect a final contract for Rancho Seco operation early in July.

A higher annual energy growth rate over peak demand in 1998 should result in higher system annual load factors and increased use of existing and future generation and transmission, said NERC. Indicating summer '98 requirements, peak demand was projected to be 691,727 MW, +2 percent growth/year from 577,149 MW for '88; planned capacity '98, 840,174 MW, +1.3 percent/year from 745,378 MW; annual net electricity use '98, almost 3.9 trillion kWh, +2.1 percent/year from 3.2 trillion kWh.

MGE rejects WPL Holding's merger offer

MADISON, WI—Madison Gas and Electric Co. rejected the offer of 1.67 WPL Holdings Inc. common stock shares per MGE share.

MGE's board of directors concluded that the WPL-proposed combination would not be in the long-term interests of the shareholders, customers, or employees of MGE, nor of the communities it serves. WPL suggested discussions about a possible combination March 3, and made the offer March 8.

The board said, in a May 9 letter to shareholders, the key to MGE's future as an independent company is its "exceptional service territory. No other service territory in Wisconsin combines

Continued on page 7

Seabrook low-power testing expected

WASHINGTON—Opponents to Seabrook nuclear plant filed a request in U.S. Circuit Court of Appeals for an emergency stay against low-power testing May 11, just days before the Nuclear Regulatory Commission was expected to grant a low-power license.

In what seemed the last hurdle to regulatory approval, NRC staff expressed satisfaction with provisions of a \$72.1 million surety bond. The insurance was put forth by the 12 owners to show that money was available to decommission the plant if it does not operate after low-power testing.

Opponents to plant operation—Massachusetts Attorney General James Shannon; Hampton, NH; and the Seacoast Anti-Pollution League and the New England Coalition on Nuclear Pollution—filed the request. If the stay is refused, and if the NRC approves, plant operators could complete low power testing before a full appeal could be heard.

Pending NRC approval, low-power testing will start by late May for the 1150-MW reactor.

Deputy Secretary W. Henson Moore said in recent Senate testimony that "Without Seabrook, New England utilities will burn an extra 11 million barrels of oil per year for at least five years."

In related news, the state of New Hampshire passed legislation that allows takeover of Public Service New Hampshire, PSNH, with a 35.6-percent ownership in Seabrook, is under bankruptcy reorgani-

zation. The state fears rate increases that might accompany a switch to federal regulation, proposed under one reorganization plan. PSNH said it considers the state another prospective bidder.

PSNH was working on a consensual reorganization plan, which was due mid-May. If progress is being made, the

bankruptcy court judge may grant an extension instead of accepting reorganization plans from other parties.

New England Electric System Co. and Northeast Utilities Co. both submitted bids for PSNH operating assets. New Hampshire Electric Cooperative Inc. offered to buy PSNH's Northern Division.

Plant operator New Hampshire Yankee may start low-power testing by the end of May, if the NRC approves and if a court refuses to grant a stay. Majority owner Public Service New Hampshire, now in bankruptcy court reorganization, faces a new challenge from a recently approved law that allows a state buyout.



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Fourth Grand Gulf increase is phased-in

Arkansas Power and Light Co. received the fourth increase of a five-year phase-in plan for its share of costs associated with the Grand Gulf nuclear power plant, according to the National Association of Regulatory Utility Commissioners Bulletin. The Missouri Public Service Commission approved the \$6-million phase-in plan three years ago. The first three rate increases were 6.6 percent, 3.25 percent and 3.25 percent respectively. The fourth increase, which went into effect March 21, was 3.25 percent or \$1.4 million, NARUC reported.

NRC approves TMI-2 water evaporation

The Nuclear Regulatory Commission has approved the evaporation of 2.3 million gallons of water processed by TMI-2, according to GPU Corp. The Atomic Safety and Licensing Board gave its approval of the process in February. GPU said it expects to have the evaporator ready to operate by August.

NYPA and ConEd sign power agreement

The New York Power Authority and Consolidated Edison Co. of New York signed a power agreement that is expected to save taxpayers \$1.4 billion over the next 10 years. Under the agreement, NYPA will provide all of the electricity for government agencies in New York City and most of Westchester County, while Con Edison will deliver the power. The agreement also allows NYPA to use

electricity from its upstate plants and from Hydro-Quebec to meet the government agencies' power demands.



NYPA Chairman Richard M. Flynn (seated left) and Con Edison Chairman Arthur Hauspurg (seated right) sign a cost-saving power agreement. Looking on are New York Mayor Edward I. Koch (right) and Stanley E. Grayson, deputy mayor for finance and economic development.

UtiliCorp, Hadson team up for power project

UtiliCorp United said it plans to join Hadson Corp. in a project that will supply power to retail electric distribution cooperatives in Virginia that are currently buying capacity from Old Dominion Electric Cooperative in Richmond, VA. The companies said their subsidiaries, UtiliCo Group and Ultrasystems Development Corp., will develop and construct three, 150-MW, coal-fired independent power facilities. Completion of the first three facilities is expected in 1993, according to UtiliCorp.

OPPD to spend \$2M to improve service area

The Omaha Public Power District (OPPD) plans to spend over \$2 million in contracts for

the maintenance and improvement of systems in its service area. "It takes a great deal of work to keep existing lines in good condition and make necessary improvements to the system. Supplementing our personnel with a private contractor helps us to do that economically by providing additional crews during the peak construction season," explained OPPD President Fred M. Petersen. Work on overhead and underground electric power lines will begin this month and continue for a three-year period, according to OPPD.

DE awarded for waste reduction program

Detroit Edison received an Environmental Excellence Award from the Michigan Department of Natural Resources for its solid waste reduction program. The utility was awarded for the development and implementation of a method to treat chemical wastes at its Monroe Power Plant. The method reduced the amount of chemical waste sludge produced at Monroe by 75 percent, according to the company. Detroit Edison said that its program will also save the company \$350,000 a year.

NARUC utility planning conference to be held

The National Association of Regulatory Utility Commissioners (NARUC) will hold its second annual Least-Cost Utility Planning Conference in Charleston, SC on September 11-13. NARUC said the conference is designed to promote a discussion on the concept of least-cost utility planning and

to provide assistance to state utility commissions in the development and improvement of existing least-cost plans. For more information contact Mike Foley at (202) 898-2214.

Hearing set for VEPCo construction requests

Virginia Power's request for construction of a combined cycle generating unit and several combustion turbines will be heard on July 5 by the State Corporation Commission. The utility has filed applications to build a 215-MW, advanced combined-cycle facility at a cost of \$134 million, and 325-MW of combustion turbines estimated at \$111 million.

NRC extends property insurance deadline

The Nuclear Regulatory Commission has extended its deadline for power reactor licensees to purchase on-site property insurance policies containing certain accident coverage provisions. The provisions require that proceeds from the insurance policies be paid to an independent trustee, after first being used to stabilize and decontaminate a reactor following an accident. The new deadline of April 4, 1990 gives insurers more time to incorporate the required provisions into their policies and to find parties willing to act as trustees. According to the commission, insurers and representatives of the nuclear utility industry have submitted three petitions for rulemaking that propose rescinding the trusteeship provisions.

Boston Edison checks Pilgrim feedwater leak

Boston Edison reported that it is still trying to determine the cause of a 50-gallon feedwater leak at its Pilgrim Nuclear Power Station. "Our preliminary assessment is that the leak was probably caused by a combination of a check valve malfunction and personnel error," stated Ralph Bird, Boston Edison senior vice president-nuclear. In addition to the utility's investigation, a team of five inspectors from the Nuclear Regulatory Commission were sent to assess the problem. Pilgrim is currently operating at about 25-percent reactor power, according to Boston Edison.

PUC pays intervenors for role in PG&E case

The California Public Utilities Commission said it compensated the San Luis Obispo Mothers for Peace and Rochelle Becker for their help with Pacific Gas and Electric Co.'s Diablo Canyon settlement. The intervenors received \$35,000 for their evidence and cross-examining of witnesses on the effects of performance-based pricing on plant safety and on whether a proposed safety

committee would be effective, according to the PUC. Under California law, intervenors who make a substantial contribution to a PUC decision and demonstrate financial need may receive compensation.

EPRI chairman named

The Electric Power Research Institute has appointed Robert N. Cleveland chairman of the board. Cleveland, president emeritus of Ohio Rural Electric Cooperatives Inc. and Buckeye Power Inc., served as vice chairman for EPRI during 1988. Public Service Enterprise Group Inc. Chairman, President and CEO E. James Ferland was named vice chairman at EPRI.

IP picks president

Larry D. Haab was named president of Illinois Power Co. succeeding Wendell J. Kelley, who will continue as chairman and CEO of the company. Haab, who joined Illinois Power in 1965, has served as executive vice president, chief financial officer and as a member of the board. Kelley described Haab as "an extremely capable executive with an excellent background in finance...."

Colorado-Ute suspends payments to lenders

Colorado-Ute Electric Association's Board of Directors announced that, due to liquidity problems, the company would have to suspend aggregate payments of \$12.6 million to the Rural Electrification Administration and the National Rural Utilities Cooperative Finance Corp. The board also initiated a program to work out the company's financial problems with its creditors. "The board's decision to suspend payments to Colorado-Ute's lenders was made to assure the continued liquidity of the company and to assure uninterrupted services to the company's 14 member-owners," stated Colorado-Ute President and CEO Robert D. Vold. As of March 1, 1989 Colorado-Ute had approximately \$892 million in outstanding obligations, according to the company.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:
Arkansas Power & Light
A \$175,000 fine for apparent violations of NRC requirements in the operation of the Arkansas Nuclear One power station.
Duke Power
A \$25,000 civil penalty for alleged violations of NRC requirements at the Oconee nuclear power plant.
Portland General Electric
A \$75,000 fine for alleged violations of NRC requirements involving control of the quality of materials installed in the Trojan nuclear plant.

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Solid foundations today will allow expansion tomorrow...

For the majority of large electric utility companies that make up *EL&P's* Top 100, 1988 was a good year. Now the success of 1988, continuing through the first five months of 1989, suggests that the time is fast approaching when the Top 100, and others, again must begin building new generating capacity...and that's where they began to get into the financial troubles from which they've just emerged.

Kilowatt-hour sales moved ahead more than 5 percent in 1988 and revenues were up by almost 5 percent. Diversified, non-utility businesses began to make differences on profit and loss statements, their revenues growing even faster than utility-only business. Common stock earnings, which fell in 1987, edged up in 1988, although the cumulative net income of the group fell as the result of large losses posted by four companies: Long Island Lighting (-\$1.1 billion), Detroit Edison (-\$429 million), Centerior Energy (-\$74 million) and New England Electric System (-\$54 million).

Even more important than the size of the earnings gain is that the quality of the earnings improved substantially. For 1988, earnings represent more real dollars and less paper gains resulting from high allowances for use of funds during construction. With better earnings, and with construction programs winding down, more work was covered by internally generated funds and less from borrowed funds. Utilities now are financially stronger.

While most of the Top 100 electric utilities are enjoying the fruits of their labors and the effects of lower demands for funds and stringent cost controls, continuing increases in usage and demand are again placing growing pressures on power supply reserves. Several areas of the country could suffer substantial inconveniences—brownouts or blackouts—should the summer prove to be a repeat of last year, with prolonged record heat and little rainfall. The short-term tactics of buying Canadian power and acquiring energy from adjacent pools could fall short of providing even a band-aid to the festering infection of non-constructivism that has become the prophylactic of choice for utility managers.

The electric utility industry has preached the gospel of gloom, doom, and impending electricity shortages since early effects of the energy crisis showed the possibility of over-construction in the latter days of the '70s. In recent years, the industry has been accused of crying "wolf, wolf" all too often.

So it isn't surprising that new construction of generating facilities is about the last thing that utility managers would want to touch. The marked propensity of state commissions to exercise 20-20 hindsight in evaluating utility decision-making and disallowing plant investments has made even contemplation of new generating facility construction distasteful.

But the time is fast approaching when responsible electric utility managements will be unable to duck their responsibilities any longer. The most palatable aspect will be that most managements of large investor-owned electric utilities are in far better financial positions to embark on generation expansion programs than at any time in a decade.

...but who will dictate what systems will be like?

Whenever we express concern about electric utility equipment manufacturers getting out of the business by selling some or all of their operations to offshore owners, we get nasty phone calls and letters from manufacturing managements. Those protests, in some cases, have been preceded by only a few months announcements of the sale of those operations to offshore owners.

We bear offshore suppliers no ill wishes. Rather, we are only concerned that the lack of domestic entrepreneurial courage, creative engineering and management competence means that the electric utility systems we will live with in the future will be shaped by directions from outside the U.S. This is not a question of national pride; rather it's a matter of national security.

Robert A. Lincome, Editor-in-Chief

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Cogen and utilities

I was extremely surprised to read some of the statistics that were attributed to Gerald C. Werner, Director of Customer Field Services for the United Illuminating Company in your April 1989 issue, page 16. While the title of the article "Customer Service is the Best Defense to Cogen" did not lead me to anticipate much praise of the cogeneration industry, the quote that (in UI's territory) "49 of 50 (cogeneration) units are abandoned—most customers give up on maintaining them" caused me to spill my coffee all over my desk. As my company, International Cogeneration Corporation, is operating two plants in the described area, and I am aware of many others, I knew this to be incorrect.

I called Mr. Werner to try to understand what he might have meant and he told me that the context of the quote was mistaken. The "49 of 50" statistic was referring to something completely different. In fact, of packaged systems installed in the 1980's in UI's territory, Mr. Werner told me that twenty-three of twenty-four are still in operation. The twenty-fourth, I have learned, has been turned off because the thermal load that it had been designed to serve is no longer in use. Instead of installing a stable of dead machinery and dropping out of the picture, as your article suggested, the small cogeneration industry in Southern Connecticut has stuck with our customers and our equipment.

An additional disagreement that I had with the article was its implication that packaged cogeneration systems are unreliable. In the three-and-a-half years that we have been operating units in Pennsylvania, New York, New Jersey, and Connecticut, we have found the quoted EPRI availability statistic of 80 percent to be significantly low. The fact that, as Mr. Werner said, "among UI cogenerators only nine percent were available on UI's peak day in 1988" says more about the weighting of statistics and the design of the units than it does about their reliability. According to Mr. Werner, one 5300 kW gas turbine unit makes up 78 percent of the small cogeneration nameplate capacity in UI's territory. That unit was out of service on UI's peak day last summer, skewing the given statistic considerably. Of the small packaged units, nine of eleven were online all day or cycling on thermal load, as designed. Of the other two, one had been switched off because the thermal load had been disconnected. The eleventh unit was down for repair. Thus, in contrast to your implied conclusion, I see this data as showing that small cogeneration systems can run predictably and reliably.

The independent cogeneration industry is a competitor to the electric utility industry, and we will always find reasons to disagree. But, as I found in discussing this article with Mr. Werner, there are common avenues for developing energy supply options that can benefit both the customer and the country. This is what our dialogue should be about. I am afraid that that common ground may never be reached if you slant your reporting so considerably. P. Richard Heimann
Director, Energy Services
International Cogeneration Corp.
Philadelphia, PA

Ed. Note: If there was a negative "slant" to the report, it was an unintentional error that resulted from condensing Mr. Werner's remarks. We appreciate Mr. Heimann's clarification and appreciate the opportunity to use him as a source of cogeneration information in the future.

Engineers and Engineers' Week

I would like to comment on the letter (EL&P April 89, pg. 33) by Mr. Peter Kushkowski concerning the apparent lack of recognition of *National Engineers' Week* and especially on his reference to Thomas Edison as the "patron saint" of utility engineers. Yes, utility engineers do need to be ingenious in many aspects of their work in order to continue to produce the safe, reliable and economic power which the public gladly consumes, but does not seem to appreciate.

Utility engineers do seem to fight an uphill battle against public criticisms and scrutiny and against increased regulations. However, we do not need the likes of Thomas Edison now. Instead, we need the true "father" of today's electrical power industry, a genius whose sole purpose in life was to make scientific discoveries and apply them in a practical manner. Unlike Edison, his contemporary, this genius had acquired a true engineering degree. Whereas Edison worked incessantly to "make a buck," this genius worked incessantly to apply electrical science and technology and to make invaluable contributions to humanity. Edison made money and lots of it by making any conceivable device that people would buy. Our true genius, on the other hand, only made devices that involved the newly discovered electro-magnetic energy and that people would need.

These two men did meet in those early days of the late 1800's when the utility industry was born, but it was not Edison who applied the alternating current technology we use today. Nor did Mr. Edison appreciate what our true genius had to offer, but instead displayed contempt. No, Mr. Edison did not believe there was much value in a formal engineering education, and he made it quite clear in his well-known comment, "success is 99 percent perspiration and 1 percent inspiration."

At a time when people in Brooklyn were dodging electrically-driven trolleys (origin of the baseball team name "Brooklyn Dodgers") and people there and elsewhere across the country were learning about the many uses of electricity, tobacco-chewing Mr. Edison stayed with his DC technology, on which many of his patents rested. In fact, Mr. Edison tried to turn public sentiment against Mr. Westinghouse's newly adopted alternating current technology in order to gain favor for his inferior direct-current technology by using such outrageous methods as electrocuting small animals to demonstrate the dangers of AC power! Some "saint."

No, Mr. Edison did not succeed in his attempts, thankfully, and, no, our genius is not Mr. Westinghouse either. The true genius and father of the utility industry receives far less recognition than do today's engineers. The true genius was Nikola Tesla.

Clearly, with so many utilities having adopted the namesake of Thomas Edison and not a single one using the name Tesla (not even Colorado-Ute whose nearby copper mines produced much of this country's initial supply for copper wire at the turn of this century and which owed its successful nighttime mining operations to Tesla's application of AC power for their lights in place of their ineffective DC system), is it any surprise that the utility industry generally regards "National Engineers' Week" as insignificant? Francis J. Lorin, B.S.Ch.E.
CyberChem Company
Columbia, MD

Continued on page 7

24th Annual Top 100 Electric Utilities Report

Sales revenues, EPS climbed in '88

Robert A. Lincicome
Editor-in-Chief

The nation's 100 largest investor-owned electric utilities enjoyed solid gains in kilowatt-hour sales and revenues in 1988. Net incomes fell, but average per-share earnings increased 14 percent, to \$2.44.

Even more important, the quality of per-share earnings was improved because, for most companies, accounting procedures such as Allowances for Funds Used During Construction played a lesser role than in previous years.

In other words, 1988 was a better year for most of the nation's large investor-owned electric utilities than 1987. Although a number of companies posted net incomes that were somewhat smaller than a year ago, the major part of the 10.3-percent drop in total net income was largely attributable to financial problems encountered by just two electric utilities—Detroit Edison Co. and Long Island Lighting Co., which between them lost \$1.55 billion of the total income decline of \$1.66 billion.

KWh sales and revenues grew

As in last year's report, kilowatt-hour sales, which increased 5.29 percent, were a bright area of utility performances. This is especially encouraging since it came on top of a 3.5-percent increase. Last summer's series of heat

storms, which sent temperatures soaring to 100-year record levels repeatedly in many parts of the country, was the major factor.

With sales performance up, electric revenues also increased. The gain in 1988, 4.8 percent, closely paralleled kWh sales performance and reflected a solid rebound from last year.

Regulatory actions disallowing investment in abandoned, high-cost facilities, which led to accounting writeoffs, were a major reason that net income performance was off. Another major factor was reduced Allowances for Funds Used During Construction, the result of big construction programs ending. Companies that showed large net income increases generally were recovering from a poor income production year in 1987.

In the following tables, an asterisk following a company name signifies either that the company is a holding company or operates diversified non-utility subsidiaries. In the Earnings table below, asterisks also appear under the "% Change from 1987" column, signifying recoveries from negative earnings a year earlier that are not statistically valid percentages and therefore are not given. In retrospect, these probably should not have been listed at the bottom of the chart since they represent positive achievements, but should have been shown separately without rank-

ing. Apologies to those listed in this manner.

Although EL&P's editorial team makes every attempt to obtain data from all of the Top 100 electric utilities, some utilities cannot, or will not provide data. The problem utility this year was Public Service Co. of New Mexico, which refused to provide data despite letters, mailgrams and numerous phone calls. As a result our report lists 100 companies, but is able to provide data on only 99. EL&P apologizes for this omission.

Customers served increased

Total electric customers served by the Top 100 electric utilities increased by 1.8 percent in 1988, to 80.7 million. Gas customers served also increased in 1988, gaining 1.3 percent to 17.6 million after declining a year earlier.

Nevada Power Co. posted the highest individual customer increase, gaining 7.6 percent.

The second largest customer gain occurred in Southern California, served by San Diego Gas & Electric Co., which enjoyed 4.3-percent customer growth. Surprisingly, Commonwealth Energy Services, in New England, ranked third with a customer increase of 3.9 percent.

On a broader basis, largest electric customer growth took place in the Southwest and Northwest, the South-

east and in other parts of Northern New England.

Kilowatt-hour sales strong

Last year marked the strongest sales year for the Top 100 since years immediately following the Arab Oil Embargo. For the first time since the mid-1970s sales increased more than 5.0 percent, 5.3 percent to be more accurate, to 2.18 trillion kWh, 100 billion kWh higher than in 1987, and an all-time high.

A year earlier, kWh sales were under 2.07 trillion kWh, but represented a sales increase of 3.8 percent, until this year, the highest since 1982.

Certainly the hot weather that engulfed much of the U.S. for long periods last summer had a marked effect on sales. Weather experts last year seemed to call each extended period of 90°F and 100°F temperatures a once-in-a-hundred-year event. Air conditioners hummed and meters spun. Residential sales, collectively, gained 5.0 percent.

Commercial and small light and power customer sales increased even more, again testifying to the heat, but also to the generally strong economy. Commercial/small L&P customer sales increased 6.07, approaching the historic growth rates of the early 1970s, and totaled 558.2 billion kWh.

Industrial/large L&P customer sales also reflected the strength of the economy as they grew 4.73 percent to 676.0

EARNINGS TABLE

Company	Rank	% Change From 1987	1988 Earnings Per Share, \$	1987 Earnings Per Share, \$
Northern Indiana Public Service	1	185.04	1.41	0.53
Interstate Power	2	151.19	2.11	0.84
TNP Enterprises* (Tex-NM Power)	3	115.35	5.19	2.41
Iowa Southern*	4	109.87	3.19	1.52
Cincinnati Gas & Electric	5	78.51	4.32	2.42
Southern Company*	6	41.67	2.72	1.92
Hawaiian Electric*	7	31.82	2.90	2.20
Cicorp*	8	31.35	3.31	2.52
Central Illinois Public Service	9	25.00	2.35	1.88
American Electric Power*	10	24.62	3.24	2.60
MDU Resources Group	11	23.97	1.81	1.46
Kansas Gas & Electric	12	22.09	2.10	1.72
Utilicorp United	13	20.73	1.98	1.64
Otter Tail Power	14	20.00	1.92	1.60
Midwest Energy*	15	19.61	1.83	1.53
CMS Energy*	16	16.14	3.31	2.85
DPL*	17	15.77	3.01	2.60
Middle South Utilities*	18	15.52	2.01	1.74
General Public Utilities*	19	15.29	4.75	4.12
Southern Indiana Gas & Electric	20	15.18	2.96	2.57
Southwestern Public Service	21	14.68	2.50	2.18
Kentucky Utilities	22	12.79	1.94	1.72
Pennsylvania Power & Light	23	12.35	3.73	3.32
Oklahoma Gas & Electric	24	12.28	3.20	2.85
Duke Power	25	11.59	4.91	4.40
Consolidated Edison	26	11.54	4.93	4.42
IPALCO Enterprises*	27	10.92	2.64	2.38
Louisville Gas & Electric	28	10.78	3.70	3.34
FPL Group* (FPL)	29	10.32	3.42	3.10
Washington Water Power	30	9.96	2.54	2.31
Commonwealth Energy System*	31	9.37	3.50	3.20
TECO Energy*	32	9.23	2.13	1.95
Pacificorp	33	8.81	3.46	3.18
Wisconsin Public Service	34	8.06	2.28	2.11
Orange & Rockland Utilities	35	7.43	3.18	2.96
Wisconsin Energy*	36	7.06	2.73	2.55
Kansas City Power & Light	37	6.31	3.20	3.01
Delmarva Power & Light	38	6.25	1.70	1.60
Wisconsin Power & Light	39	4.81	2.18	2.08
Empire District Electric	40	3.39	3.05	2.95
Northern States Power	41	3.32	3.11	3.01
Southern California Edison	42	2.95	3.48	3.38
Madison Gas & Electric	43	2.78	2.98	2.90
Central Maine Power	44	2.23	1.83	1.79
Central Louisiana Electric	45	1.99	3.58	3.52
Northeast Utilities*	46	1.90	2.15	2.11
Potomac Electric Power	47	1.42	2.14	2.11
St. Joseph Light & Power	48	1.30	2.34	2.31
Public Service Enterprise Group*	49	0.78	2.57	2.55
Duquesne Light	50	0.54	1.86	1.85
Puget Sound Power & Light	51	0.47	2.14	2.13
Minnesota Power	52	0.43	2.35	2.34
Baltimore Gas & Electric	53	0.00	3.47	3.47
Philadelphia Electric	54	0.00	2.33	2.33
Dominion Resources*	55	-0.44	4.52	4.54
Entech	56	-1.48	1.33	1.35
IE Industries*	57	-2.02	2.43	2.48
Allegheny Power System*	58	-2.22	3.96	4.05
Sierra Pacific Power	59	-2.46	1.98	2.03
San Diego Gas & Electric	60	-3.05	3.18	3.28
Iowa-Illinois Gas & Electric	61	-3.67	4.20	4.36
Florida Progress* (FPC)	62	-5.86	3.52	3.74
SCANA Corporation* (SCE&G)	63	-6.25	3.00	3.20
Tucson Electric Power	64	-7.13	4.95	5.33
Green Mountain Power	65	-8.37	2.41	2.63
KPL Gas Service	66	-8.54	2.25	2.48
Atlantic Energy*	67	-9.93	3.63	4.03
Houston Industries*	68	-10.70	3.34	3.74
Centel*	69	-11.25	2.13	2.40
Nevada Power	70	-11.44	1.78	2.01
Union Electric	71	-12.03	2.56	2.91
Texas Utilities*	72	-12.09	4.00	4.55
Central & South West*	73	-12.50	3.43	3.92
Portland General*	74	-13.88	2.11	2.45
Pinnacle West Capital*	75	-15.23	3.34	3.94
Eastern Utilities Associates*	76	-17.63	2.85	3.48
Boston Edison	77	-18.06	1.86	2.27
Idaho Power	78	-19.02	1.32	1.63
Iowa Resources*	79	-19.02	1.49	1.84
Public Service of Colorado	80	-29.84	2.14	3.05
Commonwealth Edison	81	-36.63	3.01	4.75
Illinois Power	82	-42.93	2.14	3.75
Carolina Power & Light	83	-47.69	2.04	3.90
Ohio Edison	84	-49.17	1.22	2.40
Public Service of Indiana	85	-54.90	1.84	4.06
El Paso Electric	86	-61.54	0.35	0.91
Gulf States Utilities	87	-77.58	0.37	1.65
Pacific Gas & Electric	88	-93.46	0.10	1.53
Centerior Energy*	89	-118.79	-0.53	2.82
New England Electric*	90	-130.42	-0.94	3.06
Detroit Edison	91	-189.85	-2.82	3.25
Long Island Lighting	92	-582.66	-10.06	1.73
Rochester Gas & Electric	93	*	2.25	-5.95
United Illuminating	94	*	4.85	-0.24
Central Hudson Gas & Electric	95	*	2.63	-8.12
Niagara Mohawk Power	96	*	1.21	-4.78
Central Vermont Public Service	97	*	2.58	-2.56
Public Service of New Hampshire	98	*	1.14	-14.16
New York State Electric & Gas	99	*	2.81	-3.48
Public Service of New Mexico	100	NA	NA	NA

SALES DATA

Company	Rank	1988 Total Sales (KWH)			1988 Sales (KWH)				Average Annual Residential Use		Ratio of Long-Term Debt to Net Plant	
		% Increase	Average Annual Growth 1983 - 1987	By Type of Customer (% of Sales)				1988	1987	1988	1987	
				Resid.	Comm.	Indus.	Other					
TECO Energy*	1	45.87	-3.82	39.97	30.69	22.12	7.21	12,943	12,646	33.44	33.91	
Utilicorp United	2	44.34	10.63	38.91	22.30	17.67	21.12	10,472	7,499	44.05	41.99	
Midwest Energy*	3	23.57	2.79	26.50	20.44	23.51	29.56	7,870	7,374	41.29	43.25	
Tucson Electric Power	4	23.25	8.50	25.46	15.18	31.76	27.60	8,646	8,404	63.16	65.11	
Commonwealth Energy System*	5	20.49	5.35	24.66	25.79	6.51	43.04	6,843	6,529	26.53	30.81	
Ohio Edison	6	20.11	4.41	21.38	16.98	27.67	33.98	8,425	8,140	41.37	39.05	
Wisconsin Energy*	7	19.45	2.65	25.77	23.43	39.37	11.43	7,925	7,603	54.10	44.38	
Southern Indiana Gas & Electric	8	18.95	0.60	21.01	17.29	33.29	28.41	11,669	11,518	40.98	38.85	
Allegheny Power System*	9	18.87	2.47	19.06	11.08	28.32	41.54	9,850	9,560	41.60	42.43	
IPALCO Enterprises*	10	12.70	2.84	30.51	20.78	41.65	7.06	11,010	10,525	39.22	39.45	
Minnesota Power	11	12.16	3.54	8.51	6.22	70.74	12.52	8,488	8,004	53.92	54.19	
Otter Tail Power	12	11.04	-2.54	27.41	14.77	36.36	21.45	10,183	9,280	29.90	30.17	
San Diego Gas & Electric	13	10.43	3.80	35.72	36.14	19.77	8.36	5,420	5,341	40.14	42.01	
Northern States Power	14	9.97	2.33	26.16	14.32	43.06	16.47	7,577	7,157	33.06	32.32	
Pinnacle West Capital*	15	9.77	3.16	33.69	34.91	18.26	13.14	10,945	10,684	43.87	44.81	
Kentucky Utilities	16	8.55	4.36	28.87	19.64	17.54	33.95	11,925	11,517	36.17	35.66	
Florida Progress* (FPC)	17	8.41	2.14	42.35	24.80	14.09	18.77	11,754	11,356	27.98	31.98	
Sierra Pacific Power	18	8.32	3.50	30.23	39.07	27.27	3.43	7,445	7,260	41.37	41.35	
Interstate Power	19	8.30	1.23	22.71	17.85	53.29	6.15	7,872	7,447	43.64	44.68	
Northern Indiana Public Service	20	8.12	1.19	18.83	18.82	59.91	2.44	7,286	7,083	41.16	43.59	
Long Island Lighting	21	7.78	2.40	42.37	0.00	52.00	5.63	7,905	7,568	49.31	44.59	
St. Joseph Light & Power	22	7.59	1.65	39.83	29.10	30.03	1.04	9,835	9,074	36.91	39.63	
Southwestern Public Service	23	7.59	4.37	13.35	14.28	36.76	35.61	7,924	7,757	40.06	39.83	
Iowa Resources*	24	7.42	1.57	36.58	26.15	33.83	3.44	9,150	8,560	50.45	42.09	
Puget Sound Power & Light	25	7.38	1.03	47.30	29.78	18.13	3.79	13,213	12,758	56.85	57.53	
Public Service of New Hampshire	26	7.15	1.90	32.06	14.85	31.22	21.86	7,338	7,181	56.77	56.77	
DPL*	27	7.07	4.89	31.76	19.48	27.60	21.16	10,858	10,233	54.09	57.67	
Duquesne Light	28	6.95	3.80	21.92	35.10	22.93	20.05	6,168	6,019	50.56	54.55	
Cilcorp*	29	6.93	2.43	31.60	23.18	44.20	1.02	9,479	8,941	36.36	36.36	
Delmarva Power & Light	30	6.90	4.28	28.80	26.74	26.69	17.77	9,575	9,152	42.70	46.85	
Consolidated Edison	31	6.84	1.95	27.52	66.82	4.10	1.57	3,892	3,709	36.32	37.60	
Washington Water Power	32	6.79	-0.59	30.78	21.53	13.32	34.36	13,284	13,062	53.68	50.37	
Central Hudson Gas & Electric	33	6.77	-1.50	28.73	25.95	32.59	12.73	7,059	6,738	54.72	84.45	
Centerior Energy*	34	6.67	2.17	24.63	23.41	45.53	6.44	7,462	7,217	54.02	52.64	
American Electric Power*	35	6.66	-1.15	24.63	16.85	37.37	21.15	10,962	10,526	49.63	50.47	
IE Industries*	36	6.48	0.34	32.22	26.01	33.58	8.19	8,608	8,119	39.22	29.01	
El Paso Electric	37	6.45	1.28	29.32	32.89	16.42	21.37	6,025	5,846	50.63	64.00	
General Public Utilities*	38	6.32	2.96	34.61	28.70	33.29	3.40	8,322	7,938	34.93	35.59	
Baltimore Gas & Electric	39	6.23	4.72	38.35	15.81	45.84	0.00	10,362	9,837	39.59	41.50	
MDU Resources Group	40	6.15	-0.82	40.08	19.05	37.13	3.74	7,926	7,256	45.65	47.19	
Commonwealth Edison	41	6.01	2.05	28.51	29.88	30.19	11.42	7,160	6,756	36.62	35.88	
Iowa Southern*	42	6.00	3.78	36.63	17.29	37.97	8.11	8,855	8,241	37.85	37.75	
Central Vermont Public Service	43	5.98	5.04	29.65	25.31	12.85	32.18	8,108	8,050	42.42	50.11	
Wisconsin Public Service	44	5.86	3.48	24.38	23.89	30.36	21.38	7,616	7,294	38.35	38.82	
FPL Group* (FPL)	45	5.83	3.29	50.23	39.92	6.90	2.95	11,490	11,243	36.04	36.79	
Madison Gas & Electric	46	5.83	0.34	28.98	55.29	6.03	9.70	6,768	6,400	44.73	44.18	
Entech	47	5.74	-2.01	19.67	20.60	30.08	29.65	8,482	8,377	46.74	48.07	
KPL Gas Service	48	5.67	2.17	23.42	28.38	19.15	29.05	8,916	8,320	35.50	32.43	
Public Service of Indiana	49	5.63	1.42	28.54	22.88	33.36	15.22	11,356	10,713	44.55	40.27	
Philadelphia Electric	50	5.55	2.15	31.20	14.47	51.23	3.10	7,807	7,427	50.50	49.91	
Orange & Rockland Utilities	51	5.54	1.54	34.54	22.97	31.35	11.14	7,079	6,703	41.44	42.71	
Hawaiian Electric*	52	5.46	2.61	27.54	26.00	45.71	0.75	7,195	7,114	32.40	34.92	
Empire District Electric	53	5.45	5.41	27.85	20.17	17.51	34.47	10,573	10,071	39.44	33.29	
Pacificorp	54	5.30	1.12	22.63	19.67	38.05	19.65	10,070	9,780	48.30	51.23	
New England Electric*	55	5.22	3.19	37.24	34.32	24.38	4.07	7,077	6,776	53.87	48.95	
Nevada Power	56	5.14	5.99	43.05	19.88	31.55	5.51	13,771	13,468	55.38	52.57	
Public Service Enterprise Group*	57	5.05	2.57	27.25	43.96	27.45	1.35	6,271	5,939	38.31	36.64	
Rochester Gas & Electric	58	5.01	0.81	27.93	24.39	25.44	22.24	7,124	6,940	52.51	57.32	
Cincinnati Gas & Electric	59	4.96	3.28	35.41	25.67	28.81	10.11	11,190	10,699	42.96	46.88	
Potomac Electric Power	60	4.88	3.94	26.38	42.10	21.44	10.08	10,812	10,526	41.18	41.26	
Boston Edison	61	4.88	-0.57	24.08	49.17	12.91	13.83	6,270	5,903	46.55	47.11	
Pennsylvania Power & Light	62	4.85	7.94	29.19	23.49	26.06	21.26	10,059	9,585	38.99	38.82	
Atlantic Energy*	63	4.79	3.97	43.71	37.30	18.22	0.77	8,480	8,281	37.84	41.11	
Central Maine Power	64	4.77	4.03	34.29	24.11	39.85	1.75	7,364	7,196	58.26	64.37	
Louisville Gas & Electric	65	4.62	1.80	32.37	27.10	28.86	11.67	10,467	10,282	35.00	37.42	
Public Service of Colorado	66	4.56	3.45	28.22	50.45	16.49	4.84	6,403	6,258	38.66	38.21	
Northeast Utilities*	67	4.30	2.99	38.55	35.17	22.67	3.60	8,418	8,061	48.53	46.82	
Portland General*	68	4.23	3.00	34.55	28.37	19.40	17.68	12,343	11,751	47.59	48.93	
Kansas City Power & Light	69	3.99	2.50	31.82	44.56	21.81	1.81	9,259	8,917	42.59	46.02	
Central & South West*	70	3.90	-0.36	29.56	24.56	30.70	15.17	10,814	10,464	35.16	34.70	
Texas Utilities*	71	3.80	4.80	32.99	26.72	27.61	10.67	13,498	13,147	43.86	41.26	
Detroit Edison	72	3.71	3.03	26.62	20.29	46.58	4.50	6,886	6,635	51.04	48.47	
Carolina Power & Light	73	3.62	3.49	26.22	16.78	31.73	23.27	12,571	12,557	40.17	36.70	
Southern California Edison	74	3.58	1.89	30.79	33.34	32.30	3.58	6,264	6,117	46.91	43.77	
Union Electric	75	3.50	2.38	33.16	33.34	28.04	5.46	10,845	10,390	42.65	45.51	
Iowa-Illinois Gas & Electric	76	3.44	1.13	27.04	27.54	42.57	2.86	7,192	6,861	40.81	40.47	
TNP Enterprises* (Tex-NM Power)	77	3.38	1.49	30.40	21.26	46.03	2.32	11,030	10,668	32.63	35.47	
United Illuminating	78	3.26	2.18	35.34	41.08	22.42	1.16	6,804	6,562	56.36	55.43	
Eastern Utilities Associates*	79	3.24	2.59	28.82	29.06	17.73	24.39	6,277	5,996	54.37	52.93	
Pacific Gas & Electric	80	2.97	1.53	32.92	34.90	23.26	8.92	6,537	6,489	50.58	53.28	
Central Louisiana Electric	81	2.83	-0.03	30.53	18.19	34.78	7.50	12,164	11,873	38.11	41.23	
CMS Energy*	82	2.82	2.83	31.77	26.							

**TABLE 1
THE TOP 100
TOTAL REVENUES**

Rank '88 '87	Company	'88 Revenues (millions)	'88% Change
1	Pacific Gas & Electric	7,646	6.40
2	Southern Company*	7,235	0.70
3	Southern California Edison	6,253	11.62
4	FPL Group* (F&L)	5,854	6.79
5	Commonwealth Edison	5,613	-1.07
6	Consolidated Edison	5,109	0.28
7	American Electric Power*	4,841	1.11
8	Public Service Enterprise Group*	4,395	4.36
9	Texas Utilities*	4,154	1.73
10	Houston Industries*	3,649	0.59

hour sales, buoyed by last year's extended super-hot weather and continued strong business and economic activity, was a major factor in pushing revenues up solidly. Also, a number of unregulated, non-utility activities finally got into stride and began to provide solid returns to their parents.

Rate increases—a substantial factor in revenue growth over the past few years—played a lesser role in 1988.

Revenues from electric operations only totalled \$152.8 billion, which was 4.3 percent ahead of electric operation revenues in 1987, \$146.5 billion.

Non-utility operations contributed \$4.5 billion to 1988 revenues of utility organizations. Last year, non-utility operations contributed \$4.0 billion.

Ninety companies reported revenue increases in 1988, compared with just over half the Top 100 utilities in 1987. Median growth was 4.36 percent, well above 1987's 0.5 percent.

The largest revenue gain was posted by Ohio Edison, 20.4 percent, substantially better than its 30th position performance in 1987. Duquesne Light, 23rd in 1987, ranked 2nd in 1988 at 19.7 percent. Other high-growth revenue producers included Iowa Southern Utilities, 3rd at 16.4 percent; Hawaiian Electric, 4th at 15.4 percent and Tucson Electric Power, 5th at 15.1 percent.

At the other end of the scale, utilities reporting the poorest revenue production performance were Dominion Resources, 99th at -4.7 percent; SCANA Corp., 98th at -2.9 percent; Public Service of Indiana, 97th at -2.5 percent; Duke Power, 96th at -2.1 percent; Portland General Electric, 95th at -1.5 percent and Central Louisiana Electric, 93rd at -1.1 percent. Public Service of New Mexico was listed 100th because it did not provide any data.

Among the industry's largest revenue producers there were several changes. PG&E and Southern Company held their positions as 1st and 2nd, respectively. Southern California Edison climbed from 4th to 3rd replacing Commonwealth Edison, which fell to 5th. Consolidated Edison, 5th in 1987, fell to 6th in 1988, pushing American Electric Power down to 6th. Public Service Enterprises and Texas Utilities held on to their 8th and 9th rankings, respectively. Houston Industries moved from 11th in 1987 to 10th last year, dropping Duke Power from the Top 10.

Net income fell

Net income available for common stock fell 10.3 percent in 1988 from the 1987 level, the second straight year of declines.

As a matter of fact, 1986 was the only year of the past three to reflect positive income growth for the Top 100.

Overall, income for the 99 companies

FINANCIAL STATISTICS

Company	Net Income		Revenue		Sales (KWH)		Int. Cov. Ratio		Earnings	Price/Share		% Change
	Rank	% Gain	Rank	% Gain	Rank	% Gain	1988	1987	Per Share \$ 1988	1988 (Dollars)	Low	Long-Term Debt '87-'88
Northern Indiana Public Service	1	166.10	46	5.00	20	8.12	0.77	0.26	1.41	14.125	8.625	-6.64
Interstate Power	2	152.67	51	4.36	19	8.30	1.04	0.44	2.11	31.625	19.375	-3.24
TNP Enterprises* (Tex-NM Power)	3	123.29	82	1.47	77	3.38	1.24	1.20	5.19	20.500	18.125	-0.52
Iowa Southern*	4	110.58	3	16.38	42	6.00	2.18	0.47	3.19	29.250	25.250	-0.41
Cincinnati Gas & Electric	5	87.34	75	2.10	59	4.96	2.17	1.09	4.32	29.000	24.375	2.14
Southern Company*	6	46.62	88	0.70	99	-2.21	1.00	0.69	2.72	24.250	20.375	1.15
Hawaiian Electric*	7	45.48	4	15.37	52	5.46	1.58	1.09	2.90	33.630	25.880	0.23
MDU Resources Group	8	44.59	68	2.94	40	6.13	0.64	0.47	1.81	20.125	17.125	-3.11
Utilicorp United	9	40.08	9	13.10	2	44.34	0.99	0.83	1.98	19.590	14.140	12.70
Cilcorp*	10	30.91	63	3.80	29	6.93	1.74	1.68	3.31	34.750	29.500	-0.02
Central Illinois Public Service	11	25.07	52	4.29	89	2.11	1.98	1.61	2.35	23.500	19.875	-2.34
American Electric Power*	12	24.75	85	1.11	35	6.66	1.16	0.92	3.24	29.750	25.875	1.77
Otter Tail Power	13	20.05	30	6.72	12	11.04	2.22	1.62	1.92	22.250	18.250	-2.14
Midwest Energy*	14	19.18	35	6.04	3	23.57	1.21	1.04	1.83	20.000	16.625	-3.66
Southern Indiana Gas & Electric	15	15.66	10	12.96	8	18.95	1.83	1.73	2.96	30.125	23.875	6.60
DPL*	16	15.55	43	5.39	27	7.07	1.66	1.36	3.01	27.625	23.250	0.14
Southwestern Public Service	17	14.79	67	2.97	23	7.59	1.95	1.68	2.50	28.000	22.130	-0.30
Louisville Gas & Electric	18	13.31	58	4.01	65	4.62	1.67	1.46	3.70	35.625	30.250	1.44
Kentucky Utilities	19	12.65	86	1.10	16	8.55	2.00	1.77	1.94	20.625	17.500	-0.02
CMS Energy*	20	11.70	41	5.77	82	2.82	1.34	1.02	3.31	26.500	13.500	-2.62
Duke Power	21	11.46	96	-2.13	86	2.23	2.18	1.93	4.91	49.000	42.250	0.20
FPL Group* (FP&L)	22	11.15	28	6.79	45	5.83	1.42	1.39	3.42	32.500	27.750	-1.06
Commonwealth Energy System*	23	1.11	53	4.29	5	20.49	1.08	1.21	3.50	32.875	26.500	-3.67
IPALCO Enterprises*	24	10.86	14	10.06	10	12.70	1.79	1.61	2.64	24.375	21.250	-0.54
Oklahoma Gas & Electric	25	10.83	66	3.16	90	1.91	1.93	1.65	3.20	33.750	28.500	7.75
Washington Water Power	26	10.40	13	10.16	32	6.79	1.00	0.92	2.54	28.375	23.375	5.22
Pennsylvania Power & Light	27	9.78	38	5.92	62	4.85	1.13	0.99	3.73	37.875	33.125	1.79
Consolidated Edison	28	9.64	90	0.28	31	6.84	2.61	2.43	4.93	47.500	40.875	1.32
General Public Utilities*	29	9.53	37	6.01	38	6.32	1.74	1.68	4.75	38.500	27.250	2.50
Kansas Gas & Electric	30	9.33	72	2.31	91	1.84	0.77	0.69	2.10	21.750	18.125	-14.27
Wisconsin Energy*	31	8.05	11	12.91	7	19.45	2.26	2.10	2.73	27.875	22.500	20.54
Orange & Rockland Utilities	32	7.95	25	7.84	51	5.54	1.40	1.44	3.18	33.500	27.875	0.76
Wisconsin Public Service	33	7.76	57	4.11	44	5.86	2.30	2.37	2.28	23.375	20.000	0.55
Delmarva Power & Light	34	6.84	26	7.84	30	6.90	1.33	1.29	1.70	19.250	16.500	-4.39
Kansas City Power & Light	35	6.31	48	4.50	69	3.99	1.09	0.98	3.20	32.250	24.875	-7.54
Northern States Power	36	6.28	6	13.34	14	9.97	2.12	2.14	3.11	34.250	29.250	2.18
Pacificorp	37	6.19	61	3.89	54	5.30	1.14	1.12	3.46	37.000	32.500	-6.15
Empire District Electric	38	5.67	70	2.44	53	5.45	2.02	2.16	3.05	31.875	27.500	28.25
Minnesota Power	39	5.41	24	8.05	11	12.16	1.61	1.64	2.35	26.500	21.000	4.09
Wisconsin Power & Light	40	5.40	18	9.38	92	1.83	2.04	1.89	2.18	23.875	21.375	-0.10
Madison Gas & Electric	41	4.88	36	6.03	46	5.83	1.51	1.52	2.98	32.750	30.000	6.83
Philadelphia Electric	42	4.58	81	1.49	50	5.55	1.10	1.14	2.33	21.250	16.880	7.16
Potomac Electric Power	43	4.11	84	1.33	60	4.88	1.89	1.94	2.14	24.000	19.250	6.48
Puget Sound Power & Light	44	3.87	23	8.50	25	7.38	1.38	1.26	2.14	20.250	18.000	-0.21
TECO Energy*	45	3.25	31	6.56	1	45.87	2.42	2.01	2.13	24.875	21.250	-0.05
Southern California Edison	46	3.15	12	11.62	74	3.58	1.33	1.52	3.49	34.500	29.125	7.02
Middle South Utilities*	47	2.93	64	3.20	96	0.76	1.07	1.13	2.01	16.125	8.500	4.08
Central Louisiana Electric	48	2.24	94	-1.09	81	2.83	1.29	1.26	3.59	33.875	30.750	-5.82
Northeast Utilities*	49	2.08	17	9.54	67	4.30	1.22	1.36	2.15	23.125	18.250	5.04
Public Service Enterprise Group*	50	1.56	50	4.36	57	5.05	1.60	1.56	2.57	26.875	22.000	5.93
Entech	51	1.27	45	5.02	47	5.74	0.61	0.60	1.33	37.000	30.250	-1.84
St. Joseph Light & Power	52	0.30	87	0.99	22	7.59	2.25	2.13	2.34	24.500	19.000	-7.75
IE Industries*	53	0.23	33	6.17	36	6.48	1.37	1.49	2.43	25.000	22.500	37.76
Baltimore Gas & Electric	54	0.13	83	1.47	39	6.23	2.34	2.31	3.47	33.750	29.375	-0.43
Sierra Pacific Power	55	-0.55	8	13.17	18	8.32	1.13	1.19	1.98	23.750	20.875	6.91
Allegheny Power System*	56	-0.92	16	9.55	9	18.87	1.50	1.54	3.96	41.500	35.875	-1.14
Central Maine Power	57	-1.45	59	3.95	64	4.77	0.99	1.03	1.83	18.875	15.500	13.77
Atlantic Energy*	58	-2.16	55	4.27	63	4.79	1.43	1.54	3.63	35.000	30.750	-1.96
San Diego Gas & Electric	59	-2.95	21	9.03	13	10.43	1.74	1.78	3.18	39.500	30.000	-2.08
Iowa-Illinois Gas & Electric	60	-3.70	62	3.74	76	3.44	1.83	1.96	4.20	41.500	33.750	-0.83
Florida Progress* (FPC)	61	-4.26	73	2.27	17	8.41	1.85	1.68	3.52	37.750	32.000	-11.81
Dominion Resources*	62	-5.46	99	-4.73	93	1.60	1.27	1.32	4.52	47.250	40.875	1.77
Texas Utilities*	63	-5.49	79	1.73	71	3.80	1.34	1.80	4.00	30.625	24.625	23.36
Tucson Electric Power	64	-5.65	5	15.10	4	23.25	3.07	2.95	4.95	59.880	48.750	-1.67
SCANA Corporation* (SCE&G)	65	-6.30	98	-2.93	95	1.00	1.51	1.80	3.00	33.625	28.500	-1.26
Green Mountain Power	66	-7.75	92	-0.92	83	2.82	1.94	2.17	2.41	26.750	22.000	-1.78
KPL Gas Service	67	-8.44	91	-0.03	48	5.67	1.55	1.66	2.25	26.875	22.000	12.74
Houston Industries*	68	-9.13	89	0.59	88	2.15	1.83	2.63	3.34	33.875	26.625	12.82
Nevada Power	69	-9.95	20	9.12	56	5.14	1.52	1.76	1.78	22.250	18.375	8.96
Union Electric	70	-12.11	56	4.25	75	3.50	1.31	1.30	2.56	25.000	21.375	-7.18
Duquesne Light	71	-12.16	2	19.73	28	6.95	0.75	0.79	1.86	18.875	11.750	-8.30
Central & South West*	72	-12.90	69	2.82	70	3.90	1.44	1.90	3.43	34.750	29.500	4.32
Portland General*	73	-13.91	95	-1.49	68	4.23	1.30	1.26	2.11	24.750	20.625	-3.81
Eastern Utilities Associates*	74	-13.94	77	1.91	79	3.24	0.43	0.60	2.85	33.125	21.125	15.72
Centel*	75	-14.08	71	2.42	85	2.47	NA	NA	2.13	52.250	34.250	ERR
Pinnacle West Capital*	76	-16.39	27	7.81	15	9.77	1.17	1.80	3.34	29.750	15.000	-1.71
Boston Edison	77	-16.83	79	1.83	61	4.88	0.83	1.17	1.86	18.750	12.500	17.49
Idaho Power	78	-18.90	49	4.49	97	-0.71	0.85	1.02	1.32	25.375	19.500	-1.87
Iowa Resources*	79	-19.55	76	2.04	24	7.42	1.29	1.52	1.49	22.000	15.250	22.68
Public Service of Colorado	80	-29.94	80	1.68	66	4.56	1.12	1.80	2.14	23.125	19.500	2.64
Commonwealth Edison	81	-35.27	93	-1.07	41	6.01	0.97	1.45	3.01	33.375	22.750	2.13
Illinois Power	82	-39.69	44	5.35	84	2.56	0.72	1.24	2.14	25.125	16.500	-2.47
Carolina Power & Light	83	-47.84	19	9.20	73	3.62	0.64	1.38	2.04	37.625	31.750	6.83
Ohio Edison	84	-48.95	1	20.40	6	20.11	0.57	1.00	1.22	21.000	17.250	1.13
Public Service of Indiana	85	-54.85	97	-2.54	49	5.63	1.07	1.94	1.84	14.250	11.250	11.76
Gulf States Utilities	86	-57.22	34	6.14	87	2.16	0.34	0.78	0.37	9.375	4.750	-4.78
El Paso Electric	87	-62.29	7	13.30	37	6.45	0.20	0.49	0.35	16.625	13.375	-17.91
Pacific Gas & Electric	88	-90.98	32	6.40	80	2.97	0.08	0.89	0.10	18.380	14.000	-2.88
Centerior Energy*	89	-118.95	39	5.83	34	6.67	-0.20	0.90	0.00	18.000	12.250	-4.48
New England Electric*	90	-131.44	47	4.94	55	5.22	-0.41	2.16	0.00	25.500	20.000	NA
Detroit Edison	91	-186.90	22	6.59	72	3.71	-0.90	1.07	-2.92	17.500	12.000	-9.70
Long Island Lighting	92	-682.97	65	3.17	21	7.78	-2.60	0.45	-10.08	17.125	7.125	-7.39
Niagara Mohawk Power	93	*	29	6.75	96	-1.93	0.60	-2.35	1.21	15.500	12.000	4.19
New York State Electric & Gas	94	*	80	3.92	94	1.21	0.79	-0.95	2.81	24.625	19.500	-6.09
United Illuminating	95	*	54	4.2								

ALPHABETICAL LISTING OF COMPANY PERFORMANCE

Company	Electric Sales (KWH)		Electric		Gas		Revenues		Net Income	
	(millions)	Rank	Total	% Gain	Total	% Gain	Total \$ (1000's)	% Electric	After Tax \$ (Thousands)	'88 '87
Allegheny Power System*	56,513	11	1,250,865	1.87	0	0.00	2,170,490	100.00	205,086	
American Electric Power*	104,744	2	2,683,047	1.23	0	0.00	4,840,800	98.87	626,843	
Atlantic Energy*	7,350	72	434,262	3.09	0	0.00	675,859	100.00	72,171	
Baltimore Gas & Electric	23,981	32	991,105	2.34	518,753	0.12	1,863,668	76.98	274,037	
Boston Edison	14,244	48	663,627	1.49	0	0.00	1,202,655	100.00	70,071	
CMS Energy*	29,294	26	1,431,000	1.49	1,313,000	2.34	2,942,676	56.59	271,623	
Carolina Power & Light	37,588	17	930,972	2.44	0	0.00	2,273,362	100.00	163,586	
Centel*	2,689	94	135,886	0.03	0	0.00	1,094,890	15.20	134,008	
Centerior Energy*	28,099	27	1,013,619	0.78	0	0.00	2,037,560	100.00	(73,960)	
Central & South West*	47,481	13	1,531,000	0.53	0	0.00	2,512,000	96.42	324,000	
Central Hudson Gas & Electric	5,217	81	243,824	1.09	52,564	-4.67	438,385	86.51	38,051	
Central Illinois Public Service	7,444	70	305,924	0.23	157,196	0.41	616,188	81.06	80,148	
Central Louisiana Electric	5,267	80	198,412	0.71	0	0.00	301,091	100.00	40,289	
Central Maine Power	8,972	64	464,577	3.07	0	0.00	653,971	100.00	45,849	
Central Vermont Public Service	3,180	93	133,916	2.97	0	0.00	220,761	98.64	17,117	
Cilcorp*	4,929	82	183,981	0.66	187,175	1.01	470,907	61.81	44,822	
Cincinnati Gas & Electric	18,319	38	655,751	1.69	384,921	1.65	1,385,875	72.99	206,459	
Commonwealth Edison	71,542	4	3,138,389	1.34	0	0.00	5,613,338	100.00	635,276	
Commonwealth Energy System*	7,248	74	334,586	3.94	220,284	2.20	688,764	63.12	33,427	
Consolidated Edison	33,769	22	2,898,022	0.87	1,024,368	0.01	5,108,826	82.65	561,722	
DPL*	13,563	51	444,397	1.30	274,278	0.94	1,002,378	73.94	124,677	
Delmarva Power & Light	10,225	56	351,578	3.01	80,263	1.60	768,322	86.88	77,832	
Detroit Edison	40,958	15	1,882,194	1.36	0	0.00	3,102,172	98.99	(428,583)	
Dominion Resources*	53,216	12	1,703,000	3.34	0	0.00	3,097,579	100.00	407,011	
Duke Power	66,198	7	1,565,110	2.92	0	0.00	3,626,985	100.14	497,057	
Duquesne Light	14,401	47	569,061	0.62	0	0.00	1,063,233	100.00	118,566	
Eastern Utilities Associates*	4,900	83	253,000	2.02	0	0.00	374,138	98.96	37,475	
El Paso Electric	4,250	90	233,206	2.63	0	0.00	382,107	98.72	12,110	
Empire District Electric	3,613	91	113,713	1.89	0	0.00	153,805	99.59	16,990	
Entech	9,156	62	246,437	0.41	10,806	2.20	443,681	78.34	31,899	
FPL Group* (FP&L)	59,892	8	3,018,502	3.84	0	0.00	5,853,513	79.45	447,787	
Florida Progress* (FPC)	26,131	29	1,088,560	3.64	0	0.00	2,002,000	72.74	179,800	
General Public Utilities*	38,454	16	1,816,635	1.94	0	0.00	2,833,974	99.91	283,786	
Green Mountain Power	2,140	96	74,439	2.94	0	0.00	128,613	99.12	8,898	
Gulf States Utilities	27,197	28	557,576	0.48	82,510	-0.59	1,520,477	93.11	103,143	
Hawaiian Electric*	7,385	71	330,710	2.22	0	0.00	732,716	74.45	55,008	
Houston Industries*	57,113	10	1,330,703	1.87	0	0.00	3,649,465	83.95	395,254	
IE Industries*	4,704	84	206,935	0.28	121,919	-0.35	438,252	71.82	34,154	
IPALCO Enterprises*	11,941	54	373,256	1.72	0	0.00	609,446	96.17	99,038	
Idaho Power	11,893	55	279,538	1.19	0	0.00	412,321	100.00	44,787	
Illinois Power	15,728	45	546,431	0.66	385,336	0.32	1,284,720	73.94	151,890	
Interstate Power	4,312	88	156,775	0.26	45,737	0.53	274,321	78.56	19,688	
Iowa Resources*	5,289	79	245,931	1.24	0	0.00	348,489	98.69	32,939	
Iowa Southern*	2,054	97	93,766	0.16	38,012	0.58	137,325	73.23	18,409	
Iowa-Illinois Gas & Electric	4,542	86	191,506	0.36	228,200	0.75	496,375	60.27	56,350	
KPL Gas Service	9,802	59	298,653	0.51	1,057,995	1.13	1,166,114	39.55	77,821	
Kansas City Power & Light	10,220	57	404,726	2.05	0	0.00	736,536	98.89	98,974	
Kansas Gas & Electric	8,073	66	251,849	0.75	0	0.00	526,220	98.12	76,362	
Kentucky Utilities	14,023	49	380,000	1.33	0	0.00	547,778	100.00	73,211	
Long Island Lighting	16,473	43	989,097	1.25	421,429	1.40	2,137,834	83.59	(1,121,128)	
Louisville Gas & Electric	9,067	63	317,617	1.28	240,897	0.99	661,107	73.17	75,572	
MDU Resources Group	1,844	98	110,042	-0.41	175,558	0.05	290,273	42.08	17,238	
Madison Gas & Electric	2,206	95	109,487	1.44	82,015	3.53	214,323	59.58	19,962	
Middle South Utilities*	58,071	9	1,693,609	0.91	159,516	-29.04	3,565,405	97.42	794,753	
Midwest Energy*	4,304	89	155,399	0.04	344,929	2.03	570,325	38.14	39,406	
Minnesota Power	9,896	58	117,935	1.05	8,920	1.07	460,468	85.22	67,879	
Nevada Power	7,771	68	288,982	7.58	0	0.00	409,013	100.00	47,537	
New England Electric*	20,771	34	1,233,519	2.44	0	0.00	1,519,677	93.73	(53,820)	
New York State Electric & Gas	16,672	42	745,000	1.92	139,000	2.21	1,340,169	88.93	157,975	
Niagara Mohawk Power	34,995	20	1,482,000	1.58	458,000	1.78	2,800,453	83.69	159,657	
Northeast Utilities*	24,412	30	1,223,705	1.16	171,400	0.86	2,279,491	89.14	233,922	
Northern Indiana Public Service	12,755	52	372,996	1.23	577,583	2.13	1,524,184	59.28	103,449	
Northern States Power	34,796	21	1,280,763	1.66	333,862	2.90	2,006,458	83.83	217,780	
Ohio Edison	35,685	19	1,015,508	1.03	0	0.00	2,142,572	98.90	186,170	
Oklahoma Gas & Electric	19,214	36	636,036	0.26	0	0.00	1,098,157	100.00	135,321	
Orange & Rockland Utilities	4,314	87	241,303	2.13	102,449	1.97	486,705	77.68	40,298	
Otter Tail Power	3,487	92	121,328	-0.28	0	0.00	178,221	100.00	23,025	
Pacific Gas & Electric	68,537	5	4,026,701	1.90	3,299,844	1.69	7,645,748	72.10	62,127	
Pacificorp	46,350	14	1,202,000	1.09	0	0.00	2,159,600	100.00	309,000	
Pennsylvania Power & Light	33,766	23	1,122,628	2.29	0	0.00	2,213,903	99.92	332,042	
Philadelphia Electric	32,239	24	1,437,357	1.44	332,740	2.28	3,228,712	88.28	468,765	
Pinnacle West Capital*	16,213	44	582,003	2.76	0	0.00	1,416,049	100.00	237,892	
Portland General*	17,145	39	552,162	1.48	0	0.00	762,204	98.12	97,309	
Potomac Electric Power	22,724	33	625,772	2.40	0	0.00	1,349,811	99.56	173,894	
Public Service Enterprise Group*	36,483	18	1,832,681	1.28	1,432,636	1.46	4,394,692	70.33	528,586	
Public Service of Colorado	19,194	37	974,043	0.72	841,436	1.14	1,685,290	66.22	112,169	
Public Service of Indiana	19,972	35	577,080	1.47	0	0.00	1,043,306	98.02	99,191	
Public Service of New Hampshire	7,450	69	377,461	3.27	0	0.00	603,485	100.00	52,189	
Public Service of New Mexico	NA	100	NA	NA	NA	NA	NA	NA	NA	
Puget Sound Power & Light	16,933	41	691,511	3.46	0	0.00	791,382	100.00	115,901	
Rochester Gas & Electric	7,347	73	321,643	1.45	254,143	1.61	773,978	70.23	76,114	
SCANA Corporation* (SCE&G)	14,457	46	427,089	2.23	201,399	3.10	1,083,324	72.74	120,746	
San Diego Gas & Electric	13,800	50	1,032,591	4.26	642,770	3.38	2,076,087	62.62	177,649	
Sierra Pacific Power	4,674	85	224,396	3.76	70,707	5.19	408,423	80.10	42,007	
Southern California Edison	67,886	6	3,831,656	3.08	1,193	-0.58	6,252,719	94.83	761,831	
Southern Company*	130,856	1	3,187,000	1.85	0	0.00	7,235,000	98.74	846,000	
Southern Indiana Gas & Electric	5,463	77	112,961	0.88	92,837	36.34	314,648	79.64	36,770	
Southwestern Public Service	17,009	40	347,827	0.26	0	0.00	794,504	99.52	102,294	
St. Joseph Light & Power	1,271	99	58,214	0.50	4,586	0.02	76,858	87.75	10,712	
TECO Energy*	12,426	53	443,186	2.54	0	0.00	1,033,979	89.77	114,300	
TNP Enterprises* (Tex-NM Power)	6,134	75	199,181	0.71	0	0.00	366,154	100.00	40,983	
Texas Utilities*	80,725	3	2,110,527	0.75	0	0.00	4,153,675	100.00	642,671	
Tucson Electric Power	7,860	67	260,616	2.53	0	0.00	543,064	100.00	123,445	
Union Electric	30,023	25	1,067,172	1.37	109,825	1.01	2,029,107	95.52	261,333	
United Illuminating	5,292	78	307,237	1.13	0	0.00	518,938	99.31	67,291	
Utilicorp United	5,735	76	246,076	2.52	407,176	3.73	672,799	40.99	38,372	
Washington Water Power	9,306	60	242,646	0.65	85,270	2.36	438,982	84.51	56,584	
Wisconsin Energy*	24,051	31	870,780	1.32	0	0.00	1,540,712	82.78	183,186	
Wisconsin Power & Light	9,223	61	332,923	1.52	117,940	2.75	600,933	75.59	57,933	
Wisconsin Public Service	8,840	65	317,695	1.53	169,369	1.92	604,334	72.14	52,826	

TABLE 10
THE TOP 10
NET INCOME AVAILABLE
FOR COMMON STOCK

Rank	'88 '87	Company	\$ Income (millions)	'88% Change
1	5	Southern Company*	846,000	46.62
2	2	Middle South Utilities*	794,753	2.93
3	3	Southern California Edison	761,831	3.15
4	4	Texas Utilities*	642,671	-5.49
5	1	Commonwealth Edison	635,276	-35.27
6	8	American Electric Power*	626,843	24.75
7	7	Consolidated Edison	561,722	9.64
8	6	Public Service Enterprise Group*	528,586	1.56
9	11	Duke Power	497,057	11.46
10	10	Philadelphia Electric	468,765	4.58

reporting on their 1988 performances was \$14.5 billion. A year ago, net income was \$16.1 billion (restated).

To darken the picture, total incomes reported in 1988 included some \$1.4 billion of income from non-utility activities of holding companies. In 1984, however, the Top 100 reported net income for common stock of \$16.7 billion just for utility operations. Without the effect of diversified, non-utility profits, net income performance in 1988 was \$13.1 billion—21.6 percent below the total four years earlier, hardly the picture of a robust industry.

Remember, however, that the figures are skewed because of the large writeoff taken by a few utilities. Detroit Edison posted a \$428.6-million loss and Long Island Lighting, burdened with its Shoreham investment, recorded a \$1.1-billion loss. These two utilities' income performances alone accounted for \$1.55 billion—or more than 93.6 percent—of the Top 100 Utilities' \$1.65-billion decline from 1987. In addition, Centerior Energy lost \$74.0 million and New England Electric System posted a loss of \$54 million.

The decline is the result of a variety of factors. Certainly writeoffs of investments in cancelled facilities and other regulatory disallowances were a major factor, as they have been in the recent past. Also, with the last major construction programs of the late 70s and early 80s now completed or nearing completion, Allowances for Funds Used During Construction were smaller in 1988. Since a number of companies with long-standing nuclear plant construction programs and other ambitious, costly construction programs have relied on AFUDC for a large part (and in some cases

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

SMUD follows vote, closes Rancho Seco

SACRAMENTO, CA—The Sacramento Municipal Utility District abided by the voters' wishes and shut down the Rancho Seco nuclear plant. On June 6, voters chose to close the plant 53.4-46.6 percent in a non-binding referendum.

The vote was 112,415-97,945. The large 40-percent turnout for the special referendum was fueled by heavy media coverage and a well-funded effort on both sides—an estimated \$300,000 raised to close the plant and at least \$750,000 to keep it open.

Although this is the first time nuclear opponents succeeded in 15 previous votes to close nuclear plants, industry supporters say it's an isolated incident and will not create a domino effect. Although some industry opponents tout this as the beginning of the end for the U.S. nuclear industry, other plant opponents conceded that the victory was local based on plant performance.

The lifetime operating record for the 913-MW plant was 39 percent compared to 63 percent for the industry. Rancho Seco started commercial operation in 1975 and had more than \$430 million in improvements from its December 1985 emergency shutdown until its April 1988 restart.

Since then, it operated an average of

47 percent in a test-trial run up to full-power but encountered some mechanical problems. Since restart, however, the Nuclear Regulatory Commission had taken it off its list of trouble plants.

In June 1988, voters continued to allow operation by just 1 percent for a year-long trial period. About \$2 million was spent by both sides on that effort.

A pre-election offer by Babcock & Wilcox Co. and Bechtel Power Corp.—manufacturer and architectural engineer for the pressurized water reactor—apparently did not sway public opinion. The two companies agreed to handle plant maintenance, engineering, planning and system design and analysis, with incentives and penalties based on performance. SMUD had estimated any maintenance agreement would not be final until July.

Staffing

Some changes in staff were almost immediate.

SMUD's CEO Nuclear Joseph Firlit resigned two days after the election saying he did not want to be an undertaker, according to SMUD staffer Jeff Marx. In a letter Firlit added that he hoped to work where he could advance the industry. General Manager Dave Boggs accepted the resignation with regret. It wasn't clear if the position would be refilled.

Continued on page 34

LATE NEWS

United Mine Workers on strike numbered an estimated 27,000 in eight states as of June 20, according to *The Wall Street Journal*. At least one railroad began layoffs.

Three unsecured creditors of Colorado-Ute Electric Association filed an involuntary bankruptcy petition against it. See related story, page 7.

Eastern Utilities Associates agreed to purchase a NECO Enterprises Inc. subsidiary, Newport Electric Corp. of Middletown, RI, for EUA common stock. A power purchase agreement is also part of the deal.

Wisconsin Power & Light Co. agreed to cooperate with Wisconsin Public Power Inc. System on siting a natural gas-fired combustion turbine peaking generator. WPPI plans to build the 75-100 MW project on a WP&L site to operate by 1994. WP&L would also build at the still unchosen site.

Texas A&M is 'fairly confident' on cold fusion

Mark T. Hoske
Assistant Editor

ORLANDO, FL—In what could lead to a wave of major support for the cold fusion theory, Texas A&M University announced two weeks of replication of high heat and some neutron output, at the June 5 opening session of the American Public Power Association National Conference.

A leading researcher stated he is "now fairly confident that what is taking place there is not chemical. It appears to be nuclear," said A. John Appleby, director, Center for Electrochemical Systems and Hydrogen Research, Texas A&M University.

Appleby, cautioned however, that he's unsure he could prove that statement in court. "At this point, I still feel reluctant to call it cold fusion."

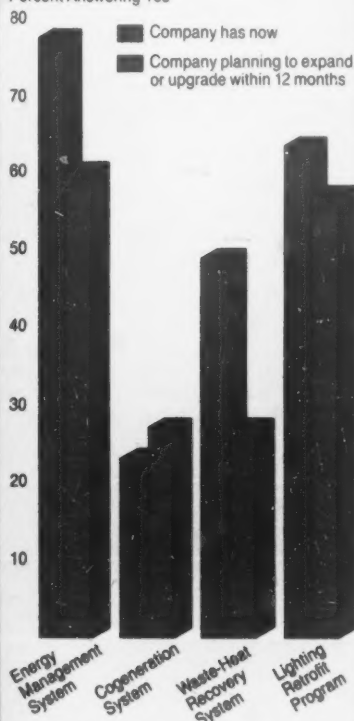
More announcements expected

After addressing the 2400 public power people, Appleby said at a press
Continued on page 34

EMS and COGEN PLANS

The Association of Energy Engineers recently completed the most extensive survey it ever conducted on energy management. Here are the results of some of the questions put to their working members.

Percent Answering Yes



100% NRC user fees likely; industry groups oppose

WASHINGTON—Despite heavy industry opposition, it seems likely that user fees will fund 100 percent of the Nuclear Regulatory Commission budget.

The current fees—at 45 percent—amount to \$1-1.5 million a year per nuclear unit. The proposed increase, in a House committee as of late May, could bring the annual fees to as much as \$4 million per unit, according to several sources.

Could see action in June

HR-1579, introduced by Rep. Morris Udall (D-AZ), may make it out of committee and onto the floor in June. David Schooler, counsel for the Energy and Power Subcommittee of the House Energy and Commerce Committee, said the idea of raising user fees originated under the Reagan administration and is supported by President Bush.

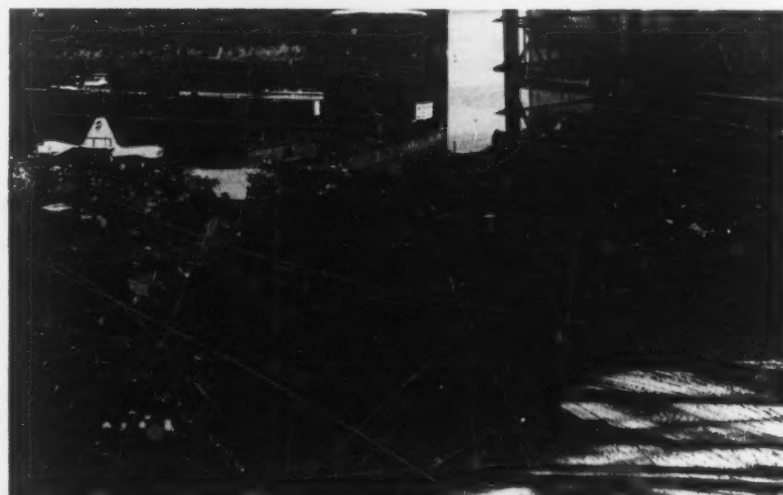
Schooler said other federal agencies are 100-percent funded by users or are moving that way. With the budget deficit, increasing user fees has broad, bipartisan support in Congress, according to Schooler.

User fees increased to 45 percent in 1988 from 33 percent in 1987.

Industry opposition is clear

The Edison Electric Institute, National Association of Regulatory Utility Commissioners Executive Committee, American Public Power Association and American Nuclear Energy Association oppose the fees. Continued on page 35

Barge delivers Tidd Plant vessel



The Tidd PFBC Demonstration Plant vessel head is trucked into place. The inset shows the vessel and the head as they arrive by ocean barge at the site in Brilliant, OH. The 70-MW, \$100-million project is funded by American Electric Power, Department of Energy and State of Ohio. A pressurized fluidized bed combustor reduces sulfur dioxide emission by 90 percent (like scrubbers) and provides the added benefit of cutting nitrogen oxide by half while making 10 percent more energy than a conventional plant.

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NPPC says current regulatory practices stifle conservation

According to an analysis by the Northwest Power Planning Council (NPPC), current regulatory and rate setting practices discourage utilities from pursuing conservation measures. Conservation is financially unattractive to investor-owned utilities because their profits are based on revenues, says NPPC. While conservation lowers electricity sales it also cuts revenues, lowering utilities' net profits. In addition, the costs of conservation incurred by most investor-owned utilities cannot be recovered through rates. According to the council, regulators push utilities to cut costs or sell more kilowatt-hours, but not to promote energy efficiency.

However, NPPC reports that many utility regulators are now considering conservation that offers incentives to utilities to make energy-saving investments. Some of the regulatory proposals include: separating utility earnings from the amount of power sold; extra returns and tax credits for conservation expenditures; and rewarding utilities for reducing customer bills. The council said that, while it plans to explore the different proposals, a recommendation will not be made until it determines the extent to which regulatory barriers influence utilities' conservation practices.

Ore. PUC asks utilities for least-cost plans

The Oregon Public Utilities Commission said it has ordered all investor-owned electric and natural gas utilities to submit least-cost planning strategies to meet the energy needs of their customers. According to PUC Chair Ron Eachus, the goal of least-cost planning is "to provide energy at the least cost to the utility

and its customers, consistent with public interest. It requires utilities to consider all known resources for meeting their energy needs. That means conservation and energy efficiency will be given as much emphasis as the generation of new energy and the purchase of power." The PUC order required energy planning to cover 20 years, with short-term action plans submitted every two years for public review by the commission.

Breeder reactor R&D must continue: ANS

In a recent policy statement, "Breeder Reactors Renewable Energy Resources," the American Nuclear Society recommends that the United States proceed with a breeder reactor and fuel cycle research and development program. ANS said the program should study the construction and operation of prototype systems in the 100- to 500-MW class. The studies can then be used to evaluate safety and economic potential so that the technology will be available when needed, according to ANS.

PSNH makes progress

Public Service Company of New Hampshire reported customer growth and increased sales in 1988, and said it is making progress in its bankruptcy reorganization. According to PSNH President and CEO John C. Duffett, the company added almost 12,000 customers to its system last year and increased sales by 5.7 percent. Duffett said PSNH also made improvements in service reliability, power plant availability and has organized teams of engineers to work closely with residential, commercial and industrial customers. In regard to the company's reorganization, PSNH Senior Vice President and Chief Financial Officer Charles E. Bayless stated

that negotiations are continuing between PSNH, the state of New Hampshire, and representatives of creditors and stockholders. "Resolving this bankruptcy within the next year is a best case scenario," explained Bayless. "But I believe that with reasonable concessions from all parties, a consensual plan of reorganization can be achieved within that time."

CVP, CMP will not buy non-Seabrook assets

Central Vermont Public Service Corp. and Central Maine Power Co. said they do not plan to acquire the non-Seabrook assets for Public Service Company of New Hampshire. According to Central Vermont Public Service, the utilities are discontinuing their feasibility study into combining the three companies. Results of the joint study, which began in September 1988, showed that under current conditions, combining the three companies might not be in the best interest of the utilities' customers and shareholders.

Damage prevention system hits milestone

The MISS DIG utility damage prevention system, managed by CMS Utility Services Inc., said it recently received its four millionth call. "With construction activity throughout the state continuing at a record-breaking pace for the fourth consecutive year, the milestone of four million calls came a lot sooner in the year than we had originally projected," said MISS DIG Executive Director Michael G. Digon. "This is an indication that contractors and homeowners are getting the message to let us know beforehand of their plans to dig, blast or drill," he added. MISS DIG is a cooperative effort between Consumers Power, over 600 other utilities and governmental agencies, and thou-

sands of contractors, according to CMS Energy. The system, created to prevent injuries to people and damage to utility facilities, was formed in 1970 and expanded statewide to Michigan's Upper Peninsula in 1976.

Appointments made to EPRI Advisory Council

The Electric Power Research Institute has appointed four members to its advisory council. The new council members are: Donald Hodel, who served as Bonneville Power Administrator, Secretary of Energy and Secretary of the Interior; Jo Campbell, Commissioner on the Texas Public Utility Commission; Benjamin Dyssart, Professor of Environmental Systems Engineering at Clemson University; and Robert Fri, president of the Washington, DC-based Resources of the Future Inc.

U.S., Japan celebrate 10 years of joint fusion energy research

A ceremony commemorating 10 years of joint fusion energy research between the United States and Japan was held in San Diego, CA, at the General Atomics Laboratory. Fusion research is "one area where pooling the resources of our two nations and the world is essential for enhancing progress toward a technical objective of broad societal value," stated Secretary of Energy James D. Watkins. The ceremony was part of a two-day annual meeting of the U.S.-Japan Coordinating Committee for Fusion Energy. The coordinating committee discussed a research program for 1989-90 and the future direction of the cooperation, according to the Department of Energy.

NAACP awards utilities for minority programs

The National Association for the Advancement of Colored People (NAACP) awarded Public Service Company of Colorado and Public Service Electric & Gas Co. for outstanding achievement in the economic development of minority enterprises, according to the Edison Electric Institute (EEI). The utilities were honored at the sixth annual EEI Minority Business Development Seminar in May. NAACP Director of Economic Development Fred Rasheed said the awards were given for the establishment of corporate policies which allow minority businesses greater opportunities to provide goods and services to the utilities.

ABB acquires division from Emerson Electric

Asea Brown Boveri has announced the acquisition of Emerson Electric Co.'s Indus-

trial Service Division. The division consists of 11 service plants and two coil plants, and has a customer base which includes iron/steel, coal, petrochemical and other industries. According to ABB President and CEO Klaus E. Agthe, the Emerson operation will be integrated with the ABB Service Co. headquartered in Montgomeryville, PA. "The acquisition of Emerson's Industrial Service Division greatly expands our service presence geographically and enables us to become a substantial industrial service company in addition to our established role as a power service company," stated ABB Service Co. President Christopher J. Village.

Chairman, president selected at WPSC

Linus Stoll was promoted to chairman of the board at Wisconsin Public Service Corp., succeeding Paul Ziemer who will continue as a member of the board and chief executive officer. Dan Bollum will replace Stoll as president, and will take on the additional responsibility of chief operating officer.

CIPS names president

Central Illinois Public Service Co. announced that Clifford L. Greenwalt will succeed Donald G. Raymer as president and chief executive officer when Raymer retires August 1. Greenwalt joined the company in 1963, was named vice president-corporate services in 1978, and moved to his current position of senior vice president-operations in 1980.

Management changes announced at NV Power

Charles A. Lenzie was appointed chairman and chief executive officer at Nevada Power Co., replacing Conrad L. Ryan who has retired. James C. Holcombe was named president and chief operating officer.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:

- Arkansas Power & Light Co.** A \$75,000 fine for apparent violations of NRC requirements regarding certain electrical components at the Arkansas Nuclear One power plant.
- Northeast Nuclear Energy** A \$50,000 fine for failure to properly test certain electrical equipment at Units 1 and 2 of the Millstone nuclear plant.
- Public Service Electric and Gas Co.** A \$50,000 fine for alleged failure to properly test certain electrical equipment at Unit 1 of the Salem nuclear plant.
- Toledo Edison Co.** A \$50,000 fine for violating NRC safety requirements during a reactor startup in December at the Davis-Besse nuclear power plant.

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NERC: without record heat, no shortages expected

PRINCETON, NJ—Forecast summer peak demand for NERC-U.S. is expected to decrease about 1 percent compared to last summer's peak, mainly due to last summer's unusually hot weather.

NERC-Canada, however, is expected to grow 2.9 percent in peak demand. For a related story on 10-year outlook, see page 7.

Without a repeat of extreme weather most regions expect available generating capacity to meet forecast demand. •MAAC-projected capacity margins are sufficient, but less than the region's objective. Weather, delays in Peach Bottom Two's accension schedule, or maintenance problems could require implementation of Alert and Emergency Procedures.

•The NEPOOL subregion of NPCC is in a similar situation.

•Generating capacity in Long Island will be marginally adequate to meet forecast demand.

•ECAR projects one chance in three that random outages of generating equipment will exceed the expected margins. That would require assistance from neighboring regions to avoid cuts in load.

Bulk transmission outlook

Outlook for bulk transmission is expected to be adequate in most regions.

•Interregional transfer capability from MAPP to MAIN is marginally adequate, despite an increase in transfer capability from last year.

•Continuing high levels of west-to-east transfers limits the first contingency incremental transfer capability from ECAR to the VACAR subregion of SERC to zero.

•Loop flow (parallel path flow) is a continuing problem in many regions. In WSCC, phase-shifting transformers scheduled for operation by August will significantly mitigate major loop flow through the Colorado area.

Drought conditions experienced last summer and winter have eased for SERC and WSCC. MAPP is improved, but still has a less-than-normal supply of hydroelectric energy.

In ERCOT, the 1250-MW South Texas Project No. 2 nuclear unit is scheduled to come online in June. Two cogenerators, totalling 406 MW, are expected to supply TU Electric by June. Firm and economy transfers among ERCOT members continue to load the bulk transmission system.

In NPCC, a new 345-kV transmission line and two 345/115-kV transformers are scheduled for service in June. These transmission facilities will improve the reliability of the Greater Boston and Northeast Massachusetts areas.

Quebec will add three units for 792 MW this summer and a fourth 264-MW unit this fall.

Since last summer SERC has added Tennessee Valley Authority's reactivated Sequoyah No. 1 1148-MW nuclear unit. Georgia Power Co. placed 848-MW Scherer No. 4 into operation in February. Florida will have two new combustion turbines totalling 76-MW. Alabama Power Co.'s Miller No. 3 667-MW coal-fired unit is scheduled for June.

SPP is adding a 100-MW cogenerator in June. A significant addition to the transmission is 135 miles of 345-kV line between Morgan and Flint Creek substations.

Total NERC-U.S. available margin for June was projected at 24.2 percent; July, 21.1 percent; August 21.2 percent; and September, 23.2 percent.

Total NERC-Canada available margin for June was projected at 23.1 percent; July, 26.7 percent; August 26.6 percent; and September, 27.9 percent.



ECAR, East Central Area Reliability Coordination Agreement; ERCOT, Electric Reliability Council of Texas; MAAC, Mid-Atlantic Area Council; MAIN, Mid-America Area Network; MAPP, Mid-Continent Area Power Pool; NPCC, Northeast Power Coordinating Council; SERC, Southeastern Electric Reliability Council; SPP, Southwest Power Pool; WSCC, Western Systems Coordinating Council.

PCB transformer cleanup

Suit heats up retrofill market

CHARLOTTE, NC—Competition in the PCB transformer cleaning and retrofill business has entered the courtroom. UNISON Transformer Services is seeking legal recourse against ENSR Corp. for what UNISON claims is patent infringement.

ENSR, in response, says there is no substance to the claim and that the suit is "an attempt to try the lawsuit publicly in the marketplace" and an "overt marketing ploy."

Infringement claimed

UNISON filed its action against ENSR on May 17, claiming illegal use of UNISON's patented retrofill method by ENSR's System 50 service. The company said it has asked the District Court of Ohio to grant an injunction that would require ENSR to cease all infringements of UNISON's two patents and to remove System 50 processors from customers' sites.

UNISON received a patent covering its transformer cleanup method on May 9. The patent relates to retrofill methods for replacing PCB-contaminated fluids in transformers with substantially PCB-free dielectric coolant, thereby allowing reclassification of the transformers to non-PCB status in accordance with EPA regulations.

David Reilly, UNISON president, stated that UNISON and parent Union Car-

bide developed and commercialized the retrofill technology covered by the patent. "We are exercising our rights under our patents to protect our proprietary interest in this technology."

ENSR responds

ENSR Corp. chairman and president, Robert Zoch, said "We are not using the methods claimed and do not infringe their patents." He declared that ENSR will continue to provide reclassification services using its patented process "and will deal aggressively with allegations raised by the lawsuit and with UNISON's attempt to try the lawsuit publicly in the marketplace."

William B. Maling, president of ENSR Operations, the division that provides the System 50 services specified in UNISON's action, called the litigation "an overt marketing ploy."

"As the market for PCB transformer cleaning heats up," he said, "UNISON seems to think that they can gain market favor by casting doubt on the position of every other retrofill service in the marketplace, including those offered by Westinghouse (Transform), General Electric, and Quadrex Corp. Before this challenge is resolved, all of these parties will be involved in a debate and resolution of patent issues."

UNISON is based in Charlotte, NC, and ENSR is based in Houston, TX.

EEL leaders meet, view imperatives

PORTLAND, OR—Improved national economic performance and adequate supplies of electricity are essential if the

Edison Medal is won by Puget Sound P&L

The 1988 Edison Medal, the investor-owned electric utility industry's highest honor, was presented to Puget Sound Power & Light Co. EEL Chairman James J. O'Connor congratulated the company for its "customer-first philosophy" and for its range of customer and consumer outreach programs.

Puget Power has been conducting regular consumer panels since 1980, producing 1150 recommendations on 24 different subjects. The company also developed the Gatekeeper program, an activity that uses customer-contact personnel—meter personnel, line crews, home energy auditors and others—to recognize signs that elderly customers need assistance. Puget Power's Gatekeeper program now has been adopted by 89 utilities in 42 states. The company also conducts a variety of other customer-based programs.

John W. Ellis, Chairman and CEO of Puget Power and incoming chairman of EEL, accepted the award on behalf of the Puget Power corporate family.

U.S. is to grow and prosper, executives of the nation's investor-owned electric utility companies meeting were told.

James J. O'Connor, chairman of the Edison Electric Institute and chairman and CEO of Commonwealth Edison Co., told delegates to EEL's 57th Annual Convention that the nation must "shape broad, strategic approaches to meet increasing electrical demand."

Similar messages also were given by EEL President William McCollam Jr., and in part by Robert M. Teeter, president of Coldwater Corp. and senior policy advisor to President Bush.

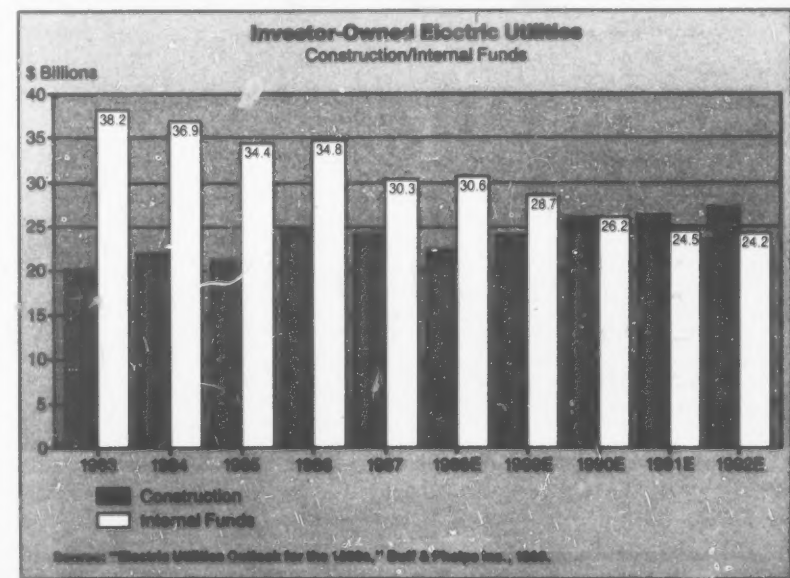
McCollam discussed how EEL is responding to the changing needs of its members. The industry, he said, is faced with growing challenges and uncertainties, which is "forcing utility companies, and EEL...to work harder and smarter."

Teeter said that the federal deficit, and international economic woes must be attacked and dealt with. Then, he declared, the nation must develop and pursue effective long-term strategies to deal with our most pressing problems, such as energy, but also including education, drugs and health care.

O'Connor issued a plea for greater regulatory flexibility to allow utilities to

Continued on page 35

Construction slows, internal financing gains



As construction in the industry has slowed, more utilities have financed construction with internal funds rather than borrow. Much of recent outside activity has been refinancing to retire higher-interest debt.

Finally,...realistic proposals to shape clean air legislation

The long-anticipated "first shoe" has fallen. The Bush Administration has revealed its proposal to clean up the air that surrounds us and it wasn't as bad as many had feared. In fact, to us, the proposed program seems a statesmanlike attempt to focus the resources of the nation on solving our serious environmental problems.

But a proposal is just a proposal. What finally comes down from Capitol Hill could be much different....Or, again, it may not.

What Mr. Bush has revealed is a carefully studied and developed program. It is aimed at solving a worsening problem—namely lousy air quality—in many parts of the U.S. It would require reductions in sulfur dioxide (SO₂), urban ozone and carbon monoxide (CO). The proposal would impact utilities heavily, but it also would focus on other major sources of pollution as well, including automobiles.

Those portions of the program aimed at reducing SO₂ and NO_x discharges are bound to have a substantial impact on utility operations. Utilities will be called upon to reduce SO₂ emissions by 10-million tons, and NO_x discharges by 2000 tons by the year 2000. Individual systems will be called to slash the rate of SO₂ discharge to 2.5 lbs/MBtu by 1995 and to 1.2 lbs/MBtu by 2000. While plants completed after 1977 have been limited to the 1.2 lb/MBtu rate, older plants were grandfathered. The Bush proposal includes those older plants in the limitations.

Cities would have to conform to ozone and CO limits by 2000, at the latest (with exceptions).

Industrial plants would have to reduce their emission of suspected cancer-causing pollutants by 75 to 90 percent in the short-term. If achieved, the Bush program projects that three-fourths of the cancer deaths now attributed to airborne toxics can be eliminated.

For utilities, the Bush proposals would allow organizations that now are discharging pollutants to the air to work out solutions that are the most economically feasible. NO_x reductions could be traded off against SO₂ discharges. Use of clean-coal technologies would buy more time for compliance. Determination of how a criteria is to be met would be left to the discretion of plant owners or managers. Reductions also could be traded off, for example in relation to intrastate (initially) and interstate (ultimately) power exchanges.

The tab for all this, whatever it may amount to ultimately, would be picked up by customers of utilities, industries and by consumers in general. The President proposes no free lunch. Initially, \$780 million per year is projected as a national cost. After 1995, annual costs are projected to be \$3.8 billion.

The Edison Electric Institute is essentially supportive of the Bush proposals. They express reservations primarily that such a program could lead to serious and expensive mistakes if adopted before final results of the National Acid Precipitation Assessment Program become available next year.

We find the proposed Bush program to be a scholarly, ambitious, but realistic proposal to clean up our air. Certainly it represents a compromise between the demands of environmentalists for instant unlimited-cost solutions and the protests of manufacturers, industrial organizations and utilities. The Bush program voices concerns, then addresses these in such a way that solutions are sought, but the methods are left to those responsible for the clean up. It balances goals against economic realities, and in a realistic time-frame.

Our primary reservation is that the projected costs are probably at least an order of magnitude too low. It's normal for Administration proposals to overstate benefits and understate costs by about this factor. But even so, it seems to us that the ends do justify the means...and costs.

The utility industry has been waiting for some substantive Clean Air program to come down from Congress for years. The Bush proposal is the closest thing to it since the Carter years. But there still is a long way to go before the proposal can become the law of the land, and there always is potential for substantial change by Congress.

Still, we're optimistic. We believe something firm and good will come from this set of proposals.

Now we have to wait for the "other shoe" to fall.

Robert A. Lincome, Editor-in-Chief

Can ridicule motivate?

I am writing to thank you for publishing Ted Pollock's article entitled "Ridicule as a motivator" (EL&P, May 1989). In this article, Mr. Pollock explains that by using comments such as "Are you a man or a mouse?", managers can motivate employees who become reluctant or frustrated with their work assignments.

I decided to inject a little ridicule into my management style and the results have been tremendous. For example, one of my employees has trouble speaking before a group. Right before he was supposed to give an important presentation, I asked him, "Now you're not going to go in there and show everybody what a scared little wimp you are, are you?" This seemed to do wonders, as he immediately mumbled something about a stomach disorder and went home sick. I gave the presentation myself, with great success.

Later in the same day, the department secretary was struggling with a new word processor and becoming quite discouraged. She had a large and important document to type, and it had to be completed in a matter of hours. Noticing her despair I took the opportunity to remark, "You mean that simple little machine has exhausted your tremendous intellect?" She showed me her most hostile look, and continued typing. I can't say for sure, but I think the ribbing helped her to complete the document a little faster. The fact that she does everyone else's typing before she touches mine now is a small price to pay for the satisfaction of making her "grow up".

All sarcasm aside, I must voice my objection to your printing this particular article in what is supposed to be a respectable publication. What Mr. Pollock is promoting amounts to kicking people while they are down. Everyone should be allowed to vent a little frustration without immediately being embarrassed into "acting like an adult" by some impatient and intolerant superior. The reluctant sales person in Mr. Pollock's example should be allowed his gut reaction without the belittling remark from his supervisor. When people are not allowed to overcome weaknesses by their own reflection and courage, but are instead cajoled into shaping up to the boss's expectation, they are robbed of a chance to build self-reliance and self-confidence.

When an attitude problem persists to the point where an intrusive correction is necessary, a sincere, candid discussion will be more productive than some aloof and hurtful remark.

It is no surprise that Mr. Pollock's title is "Management Consultant" rather than "Manager".
Chuck Rhodes
Senior Planning Engineer
Public Service Company of Colorado

Ed. note: Remember the management stratagem "All rules are made to be broken, including this one?" Ted Pollock's "Management Methods" item ("Ridicule as a motivator"), about using shock treatment with an underachiever-type employee, falls into the same class. He isn't recommending managers use ridicule as a standard modus operandi, but only in very unusual circumstances. Keys to the successful use of the ridicule tactic lay in the last three paragraphs. First, the technique isn't something to be employed in all cases of non-performance. But it may be justified "sometimes" as a last resort, to be used only when all else has failed. Second, the technique may backfire, at least temporarily, causing the employee to get mad at the manager, personally; left unsaid was the possibility that the employee might simply quit. Third, the technique should only be used in a one-on-one, private conversation.

Like most advice on how to manage, it is up to the individual to determine when, and if, any particular procedure or suggestion should be used. In fact, it seems to us, it's this ability to know when or when not to take some specific action that characterizes the good manager from other types.

Detection systems

This is in response to the letter in the May issue from the president of R-SCAN Corp. Mr. Morgan attempts to differentiate between his lightning detection system and that of his competitor, the State University of New York (SUNY). His claims belong in a paid advertisement and not on the editorial pages of a respected trade magazine.

We have a SUNY lightning detection system installed and operational, and find it to be extremely effective for our needs. Additionally, the personnel at SUNY have been competent and professional in all respects.

Ervin D. Root, Manager
System Planning & Operation
Iowa Electric Light & Power Co.
Cedar Rapids, IA

Ed. note: Mr. Morgan's letter was intended to correct what he believed to be gaps in the information contained in our report of SUNY and R-SCAN lightning detection systems. Although we agree that the information he provided was self-serving, we believed (and still believe) that he is entitled to a rebuttal if he believes our report to be either in error or incomplete. We extend this consideration to any and all people, organizations and institutions that we report on in EL&P. In fact, we urge any and all readers to correct any errors and/or incomplete reports. We do our best to be factual and complete; any time we're not, please call the errors to our attention.

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Co-ops form Western Power Producers Inc.

MONTROSE, CO.—Six western generation and transmission cooperatives formed a new organization to better coordinate their resources, share services and plan solutions to regional power supply problems and issues.

The new organization, Western Power Producers Inc., is made up of Colorado-Ute Electric Association Inc., Montrose, CO; Desert Generation & Transmission Cooperative, Sandy, UT; Golden Spread Electric Cooperative, Amarillo, TX; Plains Electric Generation & Transmission Cooperative, Albuquerque, NM; Sunflower Electric Power Corp., Hayes, KS; and Tri-State

Generation & Transmission Association, Denver, CO.

According to a spokesperson, WPPI members' objectives include coordination of electric load and resource studies, regional power pool information and activities, as well as economic studies. Another goal is the possible integration of members' generation and transmission facilities.

WPPI members also will coordinate their responses to legislative, utility industry, political and environmental issues that might affect their operations.

L. Christian Hauck, Sunflower Electric Power Corp., is president.

ELECTRIC LIGHT & POWER

EL&P

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

NOPSI sale likely

NEW ORLEANS—Very early the morning of July 12, after a hard night and nearly a year of talks, negotiators reached a preliminary agreement to sell all electric and gas assets of New Orleans Public Service Inc. to the City of New Orleans.

Specific details were not to be disclosed until July 25 when negotiators will present the agreement to the city council for public review. NOPSI's 1988 assets were \$486.35 million.

Sources indicate that a final agreement is likely and that it would be the best possible arrangements for all parties involved. Any final agreement would be subject to public hearing, council and regulatory approvals.

The points of contention have been price, employee security and terms, explained John Cordaro, group vice president, Louisiana Power & Light and

NOPSI, both utilities of Entergy Corp. (formerly MSU).

The terms include whether New Orleans' electric customers would pay their federally allocated share of Grand Gulf 1-related costs.

Glen Ortman, special council to the city on the matter, said it would be a reasonable assumption that Entergy and the city would share those costs. He added that both sides are hoping for a final deal by the end of the year and that city financing would likely be a mix of tax-free and taxable bonds.

Parties discussed NOPSI's sale over the past four years, but talks became serious in the past year with NOPSI's troubled finances. Cordaro said that negotiations have been proceeding carefully, but with optimism, as a way to resolve ongoing litigation and regulatory controversy.

On Feb. 4, 1988, after a lengthy prudence investigation, the New Orleans city council adopted a resolution requiring NOPSI to absorb \$135 million of its previously deferred Grand Gulf 1-related costs. Those were reflected as a loss in 1987, in addition to the \$51.2 million of such costs previously absorbed in connection with the March 1986 rate settlement with the council, the company said. Other Grand Gulf decisions also affected the situation.

As a result, Cordaro confirmed, NOPSI's financial solvency was threatened and so it sought independent special counsel experienced in bankruptcy matters to help evaluate options.

MeraBank trouble: Regulators limit APS payments

PHOENIX, AZ—State utility regulators temporarily limited Arizona Public Service Co. payments to parent Pinnacle West Capital Corp., fearing cash transfers for the financially troubled subsidiary, MeraBank savings and loan.

Recently, the Federal Home Loan Bank Board ordered MeraBank to acquire \$180 million in new capital to help sagging finances. Pinnacle officials questioned the legal merit of the FHLBB's order. They also stressed that APS funds would not be used for a bailout, questioned the Arizona Corporation Commission's power to make such limits, and is looking at restructuring.

The commission starts hearings on a final order Aug. 28. The order prohibits above-normal APS payments to Pinnacle and limits the Sept. 1 dividend payment to the same as for the second quarter: \$52.7 million.

MeraBank has suffered due to the region's stagnant real estate market.

LATE NEWS

Congress debates clean air as Bush sent his 270-page proposal to the Capitol on July 21. Costs to the utility industry could be as high as \$1 billion a year in 1996 to \$4 billion a year after 2003.

Contract talks on the coal miners strike were to resume July 25 between Pittston Co. and the United Mine Workers Union. Many of the sympathy strikers have resumed work. See page 7.

Pinnacle West Capital Corp. suffered a second-quarter loss of \$11.3 million, due largely to its struggling MeraBank subsidiary. The thrift unit announced it would stop giving new loans, implement layoffs and sell assets to comply with new regulations.

Tucson Electric Power Co. Chairman Einar Greve resigned as the company said it was investigating his large stock sales in the company. The company also said it might halt its dividend largely due to a regulatory decision that limits rates.

Top 100 operating report indicates trouble lies ahead

BARRINGTON, IL—EL&P's Top 100 Operating Performance report for 1988 that begins on page 15 is another warning flag in the wind for the electric utility industry in the United States.

Once more, peak demands are up, and owned capabilities and reserve margins are down. Analysts feel that if this summer is anything like a repeat of last year, the drops in the latter two figures will spell trouble for electricity users in at least some large areas.

The hope of the past—nuclear generating power—continued to add capacity in 1988, but not enough to offset the climb in usage; and the dropoff in construction and plans for construction of new baseload generating power bodes ill for future years.

Another predicted problem area is the growing dependence of the industry on imported foreign oil for generation. Reversing 1987's trend, reported consumption of oil for producing electric power jumped in 1988 by a startling 24 percent among the Top 100.

Yet, with all this, restrictions on these utilities by federal, state and local governments increased, and continues to increase, and their costs keep going up.

As of now, the main hope appears to lie with the nonutility power generators. Whether this hope is unfounded remains to be seen.

And brownouts have already begun this summer.

Consumers Power Co. challenges PSC authority

JACKSON, MI—Consumers Power Co. said it is appealing the Michigan Public Service Commission June 22 order that said CP can't buy more than 638 MW from the Midland Cogeneration Venture. The commission's decision confirmed an earlier interim decision (EL&P, March, p. 1).

CP said it is confident about a successful appeal and promised to honor the contract to buy 1240 MW from MCV, in addition to five other, smaller, previously signed power supply contracts for about 100 MW. All six were filed prior to the company's original filing with the MPSC in September 1987.

"We are confident we have the legal means to decide from whom we will buy power," said Daniel Bishop, CP spokes-

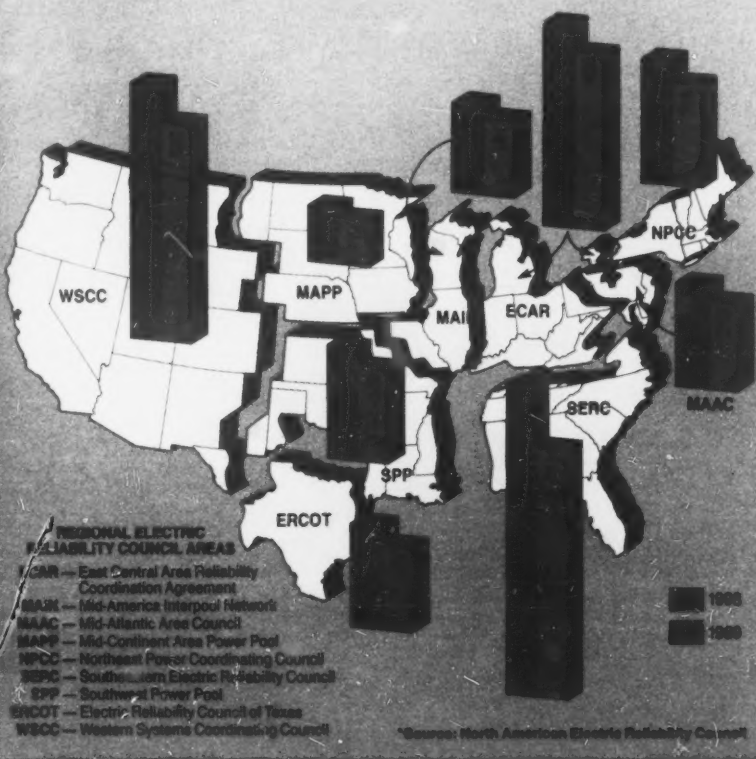
man. Bishop said a 1988 state supreme court ruling supports CP's position.

Economic growth and an increase in the percentage of customers with air conditioning is eroding CP's reserve margin. July 10, the company hit an all-time record peak for any July at 5712 MW, cutting reserve to 9 percent.

Buying the full amount from the six projects would bring the margin up to about 21 percent, Bishop said. The PSC order would hold the Midland purchase to 638 MW and overall purchases to 1160 MW.

MCV—owned in part by CP's parent CMS Energy Inc.—is a gas-fired conversion of an uncompleted nuclear plant. Commercial operation is expected in early 1990.

PREDICTED ANNUAL NET ENERGY FOR LOAD* (Millions of GWh)



Net energy available to meet load requirements will total 3,349 million

MWh in 1988, according to forecasts by the North American Electric Reliability Council. This represents a 2 percent per

increase from RC's forecast of 02 million MWh for 19. NERC regional forecasts are shown

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South Texas Project Unit 2 starts up

Unit 2 of the South Texas Project began commercial operation in mid-June, according to Central and South West Corp. The unit received a full-power license from the NRC in March, and now must be certified in commercial operation by the Public Utility Commission of Texas. Owners of the South Texas Project include Central and South West Corp., Houston Lighting & Power Co., City Public Service of San Antonio and the City of Austin.

Vogtle-2 begins commercial operation

Georgia Power Co. reported that Unit 2 of its Vogtle plant started commercial operation in time to help meet summer electricity demands. Both Vogtle units and Plant Hatch, a two-unit nuclear plant located in southeast Georgia, supply about 20 percent of the state's electricity, according to the utility.

Carr to succeed Zech as chairman of the NRC

President Bush has appointed Kenneth Carr chairman of the Nuclear Regulatory Commission. Carr, an NRC commissioner, succeeds Lando Zech. "I have served with Admiral Carr both in the U.S. Navy and here at the NRC, and I know first-hand his dedication to safety," stated Zech. "I know that Admiral Carr as the chairman will push for further improvements so that our nation can be assured of safe and reliable nuclear power," he added.

Met-Ed seeks PUC approval of competitive procurement program

Metropolitan Edison Co., a subsidiary of General Public

Utilities Corp., said it is seeking regulatory approval of a pilot program to obtain power from non-utility generating facilities. The utility filed its request for a competitive procurement program with the Pennsylvania Public Utility Commission. "We believe competitive procurement will enable us to meet this projected energy requirement cost-effectively," said Robert C. Arnold, senior vice president-power supply for GPU Service Corp. The utility predicts it will need about 200 MW of additional energy beginning in 1995.

CMP names president

Central Maine Power Co. (CMP) appointed Joe C. Collier, Jr. president and chief executive officer. Collier was previously senior vice president for corporate planning and regulation at Florida Power & Light Co. He replaces John W. Rowe, who left CMP Jan. 31. "Joe Collier's impressive record in conservation, cogeneration and planning will produce real benefits for CMP customers and shareholders, and for the State of Maine at large," said CMP Chairman George H. Ellis.

Leva to head New Jersey Utilities Assn.

Jersey Central Power & Light Co. President James R. Leva has been named president of the New Jersey Utilities Association. The association is a trade organization which represents the state's regulated electric, natural gas, telecommunications, water and sewer companies. Leva succeeds J. Richard Tompkins, president of Middlesex Water Company.

OEUI chairman chosen

The Ohio Electric Utility Institute has selected Charles A. Heller as chairman and president for a one-year term ending

June 1990. Heller, president of Ohio Power Co., replaces Ohio Edison Co. President Justin T. Rogers Jr. The Ohio Electric Utility Institute is the trade association of Ohio's eight investor-owned electric companies.

UtiliCorp United buys Michigan Gas Utilities

UtiliCorp United said it has completed its previously announced acquisition of Michigan Gas Utilities. The natural gas distribution utility was purchased from Michigan Energy Resources Co. for \$62 million, according to UtiliCorp. "Michigan Gas Utilities is a well managed winter peaking operation serving an area that is experiencing continued economic growth. This will create additional balance between our winter and summer peaking earnings periods," stated UtiliCorp Chairman and President Richard C. Green, Jr. Michigan Gas Utilities is headquartered in Monroe, MI.

Schlumberger Canada announces acquisition of C&D Meter Reading

Schlumberger Canada Ltd. has purchased C&D Meter Reading Services, the largest meter reading and billing company in North America, according to Schlumberger Industries. C&D will become part of Schlumberger Industries' Sangamo Electricity Division, which designs and manufactures products and systems to meter the production, transmission, and distribution of electricity. Schlumberger Canada Ltd. is an oil field services and electronic measurement and systems company.

MN Power subsidiary purchases FL utilities

Topeka Group Inc., a wholly-owned subsidiary of Minnesota Power, announced its acquisition

of Deltona Utilities Inc., United Florida Consultants Inc., Pelican Utility Co., and Deltona Utility Consultants Inc. According to Topeka, the companies collectively provide utility service to approximately 85,000 customers in 10 Florida communities.

Consumers Power wins safety award from NSC

Consumers Power Co. earned a first place award from the National Safety Council (NSC) for achieving the safest work performance among large combination utilities in the United States. The company said it recorded 7.8 million consecutive safe work hours from Dec. 5, 1988 to May 2, 1989. "Consumers Power is a national leader in safety, not just among utilities, but throughout industrial America," stated NSC President T.C. Gilchrest.

Utility venture formed by Bechtel/Booz, Allen

Bechtel Power Corp. and Booz, Allen & Hamilton announced the formation of a joint venture, Booz, Allen/Bechtel Utility Performance Services. According to Booz, Allen, the venture will focus on helping utilities improve electric power production, and improving the organizational efficiency of companies with nuclear plants. "Our combined expertise will be extremely valuable in helping utility management achieve lower operating costs, higher availability and more efficient operations," said Bechtel Power Corp. Vice President Lou Peoples.

NRC extends operating license for Kewaunee

The Kewaunee nuclear power plant was granted a five-year extension of its operating license by the Nuclear Regulatory Commission. The 40-year license will now expire December 21, 2013, according to Don Hintz, senior vice president-power production at Wisconsin Public Service. "...the fact that we'll be able to operate this plant another five years will save a great deal of money for our customers," Hintz explained. The Kewaunee plant is operated by Wisconsin Public Service and owned by WPS, Wisconsin Power & Light and Madison Gas and Electric.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:

- Commonwealth Edison Co.** A \$50,000 fine for a violation of NRC safety regulations at the Byron nuclear power station.
- Duke Power Co.** A \$75,000 civil penalty for alleged violation of NRC requirements at the Catawba nuclear power plant.
- GPU Nuclear Corp.** A \$50,000 fine for use of un-

qualified electrical equipment in the Oyster Creek generating station.

New York Power Authority A \$25,000 fine for alleged failure to comply with NRC requirements for the physical protection of the Indian Point Unit 3 nuclear plant.

Virginia Power Co. A \$500,000 fine for violations of NRC safety requirements governing the operation of the Surry nuclear power plant.

Fermi 2, Ft. Calhoun taken off NRC list of 'troubled' plants

Detroit Edison's Fermi 2 power plant and Omaha Public Power District's Fort Calhoun Station have been removed from the Nuclear Regulatory Commission's list of plants requiring increased regulatory attention. Fermi 2 was placed on the list in 1986 and Fort Calhoun in 1988, according to the utilities.

Nevada Power connects 300,000th customer

Nevada Power Co. said it recently connected its 300,000th customer. To commemorate the event, a certificate for 25 shares of Nevada Power common stock was presented to the new customer. According to Nevada Power President James C. Holcombe, the company has ranked either first or second in customer growth rates of all electric utilities over the past 15 years.

PG&E tests new fruit dehydration process

Pacific Gas & Electric Co. said it is participating in a joint research project to dehydrate fruit without changing its shape, color, taste or nutritional value. The new process, MIVAC, dehydrates fruit through the use of a vacuum microwave system that dries the fruit from the inside out. Also involved in the project are California State University, Fresno, and other utilities in Southern California, according to PG&E.

Entries sought for NLB annual awards program

The National Lighting Bureau (NLB) is accepting entries for its 10th annual National Lighting Awards Program. According to NLB, the program was established to recognize lighting applications which demonstrate the value of effective electric illumination. To be eligible, the project must have been completed on or after Jan. 1, 1987 and entries must be received no later than October 15, 1989. For more information write: the National Lighting Awards Program, c/o National Lighting Bureau, 2101 L Street NW, Suite 300, Washington, DC, 20037 or phone (202) 457-8437.

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Electricity bills decreased last summer, says survey

WASHINGTON—The national average residential electricity cost last summer was 8.32 cents per kilowatthour for 500 kWh, down 0.7 percent from the previous year, said a survey by the National Association of Regulatory Utility Commissioners.

That compares with a 4.4-percent jump in the Consumers Price Index during the same period, NARUC stated.

The average rate for the same 500 kWh was 8.04 cent per kWh during winter 1987-88, according to a similar

NARUC survey. Over 12 months the rate dropped from 8.10 to 8.04 cents rate per kWh, the first time that rates have dropped since the mid-1970s when NARUC began such surveys.

Rates last summer ranged from a low of 4.2¢/kWh for Washington Water Power Co. customers in Northern Idaho, to 14¢/kWh for Commonwealth Edison Co. customers in Northern Illinois.

The study shows 10 service territories where consumers pay more than 11¢/kWh and 21 service areas where consumers pay less than 6¢/kWh. Actual consumers' rates depend on the usage level and applicable state sales tax.

According to Department of Energy regions, the Northeast and Pacific regions were most expensive and the Northwest and Southern, the least.

The survey included 188 service areas of major investor-owned regulated electric utilities in 49 states and the District of Columbia. The bills for residential electric service for June, July and August were reported to NARUC for 250, 500, 750 and 1000 kWh.

A copy of the 211-page report may be obtained for \$19.50 from NARUC, P.O.

Box 684, Washington, DC 20044. NARUC is a nonprofit organization.

Rank	DOE Region	Avg. Cost Cents/kWh 500 1988
1	2 North East	10.6
2	9 Pacific	9.3
3	1 New England	9.1
4	5 Mid-West	8.6
5	7 Central Plain	8.4
6	6 South West	8.2
7	3 Mid-Atlantic	8.1
8	4 Southern	7.5
9	8 Rocky Mountain	7.3
10	10 Northwest	5.5
National Average		8.32

SMUD evaluates bids; plant may stay nuclear

SACRAMENTO, CA—Quadrex Corp. looks like the top prospect after the 10 days of bidding for the Sacramento Municipal Utility District's closed Rancho Seco plant, according to criteria laid out by SMUD. Bidding was June 21-30.

Quadrex and Stone and Webster Engineering Corp. offered \$232 million for the plant, closed by SMUD following a non-binding June referendum. It was the only proposal received that would keep the plant nuclear-powered, assume ownership and license and decommissioning, SMUD said.

Sacramento Delta Power Corp., a subsidiary of Portland General Exchange Inc., offered \$100 million for non-nuclear components in an offer to repower the plant for natural-gas.

CMS Energy Corp., parent to Consumers Power Co. in Michigan, also proposed conversion to natural gas.

The Quadrex proposal includes \$50 million in cash, the assumption of over \$182 million in current SMUD decommissioning liabilities and nuclear insurance obligations required by Price-Anderson, and the offer to sell power to SMUD at pre-determined rates.

SMUD staff were clarifying parts of the Quadrex proposal and planned to report to the board July 20, about the time EL&P was scheduled to print.

SMUD chose to consider only the Quadrex proposal partly because of an Aug. 11 filing deadline to put the mat-

ter on a Nov. 7 referendum, since it involves continued nuclear operation at the plant. A SMUD spokeswoman said that other bids had not been ruled out.

Consolidation Power Co. and Methacal Corp. submitted bids, but did not include the \$500,000 deposit required to cover costs of evaluating the bids.

At Rancho Seco, SMUD will cut nuclear staff by 500 and non-nuclear staff by 100. The cuts will be made by voluntary separation proposals first, then layoffs.

NEPCo gets OK for marginal wholesale rates

WESTBOROUGH, MA—New England Power Co. has been given approval by the Federal Energy Regulatory Commission to employ marginal-cost rates in wholesale transactions.

According to NEPCo, the approval resolved the rate design portion of the rate case filed last September. It will be revenue neutral, said the company.

Only utility

The company said it is now the only wholesale generating and transmission utility approved to use a marginal-cost rate design.

Richard P. Sergel, vice president of rates for NEPCo's affiliate, New England Power Service Co., said that "by implementing a marginal-cost rate de-

sign, we demonstrate to each customer the costs that increased electrical usage places on the company, thus emphasizing the importance of energy conservation." Pointing out that energy conservation is especially important in New England, where electric capacity is tight, he suggested that the new rate will show customers that increased usage will lead to higher costs, yet will still allow the company to charge rates that are among the lowest in the region.

Under NEPCo's marginal-rate design, and the theory it is based on, customers can be expected to expand their electrical usage to the point where the value to them of an additional unit is equal to NEPCo's cost to produce that unit. At that point, they will theoretically stabi-

lize use.

The company's marginal-cost rate design is designed to collect the embedded revenue requirements while simultaneously providing a marginal-cost signal to customers. This involves two blocks of both demand and energy charges:

- An initial block (applicable to 80 percent of each customer's average monthly usage in the base year 1985).
- A tail block (applicable to all usages in excess of the previous level).

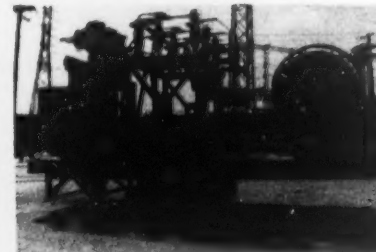
The tail block demand and energy charges are based on NEPCo's estimates of capacity and energy costs (beside the costs recovered under the fuel adjustment clause) for the next 30 years, adjusted for peak or non-peak months and time of use. Both initial- and tail-block energy charges are higher for onpeak hours.

Attorney Edward Berlin of Swidler & Berlin, NEPCo's counsel, said the FERC did allow a Wisconsin utility to use a marginal-cost wholesale rate design back in 1983. But that decision was reversed by the U.S. Court of Appeals in 1984. The two situations differ, he pointed out, because unlike the Wisconsin decision, the NEP case involved settlement by agreement of all the affected parties. Settlement was reached by NEPCo, state regulatory agencies in Massachusetts, Rhode Island, and New Hampshire, and all of NEPCo's wholesale customers except the town of Norwood, MA.

Rate increase already effective

The company's 1988 rate filing at FERC also included a request for a rate increase. This increase went into effect on May 1, 1989, subject to refund and a settlement of most of the issues associated with this aspect of the filing. These issues have been submitted to FERC and will be addressed in a later order.

Substation travels to sites where needed



"This substation can be moved to a trouble spot, connected and placed in-service in an estimated eight hours," says Bob Heatin, Public Service of New Hampshire transmission substation engineer. The custom-built, two-module unit can be relocated to any of PSNH's 35 major substation locations. The primary voltage on the transformer is 115 kV, and the secondary is 34.5 kV. The \$800,000 substation contains all the protective devices and mechanisms that a permanent one does. PSNH substation electricians and line crews are being trained on installation and operation of the mobile substation, which was manufactured by Westinghouse Electric Corp., St. Louis.

Commissions should regulate, not manage, utilities

Who should decide if and when an electric utility can build new capacity? Who should establish limits on the amount of generation to be made available at any given time within a state? Who is responsible for deciding how future customer demand for electricity will be met?

Broadly accepted historical precedent suggests that the answer to all three questions is *local utilities*, which are mandated by law to provide a power supply sufficient to meet customers' demands. But the recent actions of the Michigan commission make it clear that answers to such questions aren't as simple and straight forward as many might believe.

Briefly, the Michigan Public Service Commission has ruled that Consumers Power Co., the operating utility subsidiary of CMS Energy, must limit use of power from its Midland Cogeneration Venture (see p. 1 story) to not more than 638 MW, that it must take 522 MW from other cogenerators, that not more than 55 percent can come from any one source and not more than 75 percent from any one fuel (which is why the MCV portion can't exceed 638 MW) and that the total of purchased power must not exceed 1160 MW.

Back in March, we took the position (see "Commission performance: a narrow path to walk," p. 4) that although the Michigan Commission's actions were not unflawed, they did represent a sincere effort to stimulate a more competitive power-supply environment in Michigan that would benefit the customers of Consumers Power. The goal, as we read it, was to encourage non-utility sources of generation to compete for Consumers Power's business. Although we still believe that the commission acted in good faith, it's now clear that the commission overstepped the bounds of its authority.

Certainly a state commission has the right to conduct its own studies and develop projections of future power requirements. It has the right, and responsibility, to meet with the utilities under its regulation and to discuss those projections and reconcile them with utility estimates. It seems to us that a commission has the right and responsibility to set the basic ground rules under which a utility can evaluate all its power supply alternatives.

But commission personnel come and go. Whether elected or appointed, commissioners seldom remain on the job as long as it takes to build a generating station. Thus commissioners seldom will be around to accept the blame and responsibility if a wrong decision precludes a regulated utility from meeting customer demand. Nor can short-term regulators be held responsible for any power supply deficiencies resulting from cogenerators failing to deliver on promises or contracts.

When a commission decides unilaterally how a utility must or must not act, and specifies how much of a given commodity the utility will purchase, from whom and at what price, it is moving into the utility's board room. It is making specific management decisions...and it is making those decisions without assuming any of the responsibilities for their consequences.

Authority without responsibility is wrong. Moreover, as was the case in Michigan, when a commission rules that a utility must act contrary to binding legal contracts it has entered into, it is not acting responsibly.

As the old saying goes, "The road to Hell is paved with good intentions." Need we say more?

A win-win-win-win-winner

Talk about good deals! The recent announcement of the 55-MW combined-cycle power plant to be built in Boron, CA, has to be one of the best. First, Southern California Edison will receive primary power from the \$70-million unit. Westinghouse Electric, through its Wesgen Inc. subsidiary, will build and operate the plant, as well as own what is reported to be a "substantial" portion of the facility. Westinghouse also will provide the 40-MW combustion turbine and 15-MW steam turbine. Southern California Edison Co. gets the power. Pacific Gas & Electric will derive revenues and profits, from selling the plant natural gas. U.S. Borax & Chemical Co. will get economical process heat and backup power for its plant. Finally, Prudential Insurance of America makes a profitable loan. Everyone, including customers, wins.

EL&P

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Transmission access

Your editorial in the May issue of *EL&P* (p. 4) made several good points concerning electric power transmission access.

You state that "the vast majority of investor-owned electric utility managements are dead set against any sort of shift in procedures, policies or regulations that would allow any outsider access to their transmission facilities...because they believe any move toward opening up the transmission network to outsiders would pose a direct threat to their customers and shareholders." You then go on to observe that this point of view could cause the industry to fail to take advantage of opportunities [to] sell transmission to third parties at "fair" but profitable rates.

I don't know if this point-of-view is indeed shared by a "vast majority" of the industry, but I do definitely agree that to the extent it does, it reflects a lost opportunity for, not threat to, the industry's shareholders and its customers.

We are all sensitive to the fact that the reliable operation of our electric power system must continue to be a top priority, but pursuit of this important priority need not exclude the pursuit of other important goals, including the use of the electric power transmission system to improve the efficiency and reduce the costs of the generation sector.

The increasing competition in the electric power industry is not only inevitable, but it is also good. It will enhance the efficiency of this critical energy sector without eroding the integrity and reliability of the system. But in order to fully realize the advantages that are available from competition in the electric power industry, we must have a transmission system that is capable of moving power to market. This requires not only an adequate physical system, but also a policy regime that offers the necessary assurance that the system will be made available to generators willing to pay the fair costs of moving their power.

On this point I agree with your observation that it would "be better [for the industry] to work creatively to accommodate transmission access on a voluntary basis, rather than wait for federal and/or state regulators to impose their idea of what's best." It strikes me that a voluntary regime of transmission access to power suppliers is probably the best way to assure the continued integrity of the system and the proper accommodation of competition in the generation sector.

Martha O. Hesse, Chairman
Federal Energy Regulatory
Commission,
Washington, DC

Metering trends

I enjoyed the "Complex requirements change metering operations," in your May issue (p. 38).

Sam Hardy's comments in the last paragraph of the article focusing on metering and the customer are particularly timely and interesting. Customer wants are changing metering and even the total customer billing process.

My company, Kansas Gas & Electric Co., Wichita, is a 50-percent owner in CIC Systems Inc., Brentwood, TN, makers of PowerStat, a prepaid electric system. The system does exactly what Mr. Hardy described as "the system of the future." And PowerStat has met with overwhelming customer acceptance in tests conducted over a three-year period. The product can provide time-of-use pricing, customer-premise load management, prepayment that greatly enhances cash flow, and it eliminates all the negative customer interfaces.

PowerStat fits well with existing standard metering systems, yet uses current technology to benefit both the utility and customer.

Steven G. Menasco
Assistant Manager-Wichita Region
Kansas Gas & Electric Co.
Wichita, KS

Utilities plan lowest raises for salaried workers

NEW YORK—Utilities will give salaried workers the lowest pay increases, 4.5-5 percent, this year and next among classifications in the Conference Board's annual private-sector salary survey covering 501 companies in a wide variety of industries.

Increases for salaried workers in all industries studied will average 5 percent this year and next, while executives will receive slightly higher pay hikes, with increases averaging 5.5 percent, the report said.

"Relatively low rates of inflation have helped companies hold down salary costs for four consecutive years now," explained Charles Peck, a compensation specialist at The Conference Board. "But another factor is that more companies are using special merit

awards, incentive plans for outstanding achievement and other types of variable pay to keep salary costs under control."

The Board reports that 76 percent of surveyed firms uses at least one variable pay program. Most popular is the payment of special cash rewards for outstanding individual contributions (40 percent). About 36 percent offer incentive pay for reaching specific performance targets; 26 percent give lump-sum merit awards; 26 percent also have profit-sharing programs; 18 percent offer team incentives and 15 percent have gain-sharing programs.

These are "increasingly being provided for employees other than executives and sales personnel, who have long enjoyed such benefits," Peck noted.

Salary Outlook

	Number of Companies	1989			Number of Companies	1990 Est.		
		Median	Low	High		Median	Low	High
All Industries								
Nonexempt	468	5.0%	4.5%	5.5%	322	5.0%	4.5%	5.5%
Exempt	490	5.0	4.5	5.5	347	5.0	4.5	5.5
E. active	474	5.5	5.0	6.0	322	5.5	5.0	6.0
Utilities								
Nonexempt	54	4.5	4.0	5.0	42	4.5	4.0	5.0
Exempt	54	5.0	4.5	5.5	42	5.0	4.5	5.5
Executive	50	5.0	4.5	5.5	44	5.0	4.5	5.5

Site narrows for first private enrichment plant

CHARLOTTE, NC—Louisiana Energy Services—a five-partner joint-effort—is proposing a site near Homer, LA. for the nation's first privately owned facility for nuclear fuel enrichment services.

Three electric utilities are involved in the project: Duke Power Co. of Charlotte, NC; Graystone Corp., a subsidiary of Northern States Power Co. based in Minneapolis, MN; and Louisiana Power

and Light of New Orleans, LA. Other partners are Fluor Daniel Inc. based in Irvine, CA, and Urenco, a European enrichment consortium based in Marlow, England.

Duke Power had previously supported such a private enrichment effort, so the June 9 announcement was not unexpected. The consortium is proceeding under a memorandum of understanding effective June 1.

The plant, expected to be operational in 1996, will be capable of supplying approximately 15 percent of the enrichment requirements of U.S. nuclear power plants, the company said. It will use Urenco's centrifuge enrichment technology, utilized in Europe for more

than 13 years.

The physical separation process uses a centrifuge to enrich gaseous uranium hexafluoride, above 133.4° F. Low pressure prevents the release of the corrosive-chemical gas. The materials, before and after the process, are solid. The enriched uranium hexafluoride is then shipped to a fuel processing plant.

Enrichment typically represents 40 percent of the cost of the fuel. U.S. enrichment services have been provided by the U.S. government for 45 years.

A one-year evaluation is underway to choose the actual site, somewhere in Clairborne Parish. About 400 construction jobs and 200 permanent jobs are expected.

New ventures: ABB, gas turbines, Cablec purchase; Seabrook, Shoreham

BARRINGTON, IL—Various new ventures in power plants and industry suppliers highlight recent developments.

Westinghouse new plants

Westinghouse Electric Corp. contracted with Intercontinental Energy Corp. to supply two 300-MW, cogeneration power plants in Bellingham, MA and Sayreville, NJ, for \$600 million.

Chase Manhattan Bank structured and underwrote the financing and syndicated it to a group of 10 banks.

The natural-gas fired, combined cycle units are expected to begin commercial operation in 1991. Boston Edison Co., Montaup Electric Co. and Commonwealth Electric Co. will buy Bellingham electricity. Jersey Central Power and Light will buy Sayreville electricity.

In a separate transaction, Westinghouse took an equity position in a \$70-million, combined-cycle, 55-MW, natural gas cogeneration unit that will provide electrical energy to Southern California Edison Co.

More cable consolidation

The parent company of Cablec Corp., a major power and control cable company, bought BRIntec Corp. for about \$88.5 million cash on June 16.

The Brand-Rex divisions of BRIntec, manufacturers of electronic and electrical cables, will operate as affiliates of Cablec Corp. Brand-Rex Ltd. of Scotland will be integrated into BICC Cables in Europe. LPL Investment Group Inc., parent company of the Amphenol Corp., is to buy the majority of BRIntec's connector businesses.

Cablec Corp. is based in New City, NY. BRIntec's headquarters will remain in Willimantic, CT.

ASEA Brown Boveri's new subsidiary

ABB Energy Ventures of Princeton, NJ, is a new subsidiary that ASEA Brown Boveri formed to develop, own and operate nonutility generation and transmission projects around the world.

Peter Giller, president of the new venture, said the company was formed to benefit from the global trend to independent power producers.

Shoreham, Seabrook

About 95 percent of Long Island Lighting Co. shareholders approved the Shoreham shutdown package, as expected. Federal initiatives are challenging transfer of license to the state and decommissioning.

**Completion of
Electric Light & Power's
EEI Annual Meeting coverage
will appear next month**

Top 100 correction

Several rankings of Dominion Resources in the June Top 100 Electric Utilities Financial Performance report (pp. 13-16) were incorrect because the data furnished was incomplete. Dominion Resources revenues increased 2.4 percent in 1988, which would have ranked the company 72nd; its net income, up 1.84 percent, would have ranked it 50th. Dominion Resources' 1988 common stock earnings performance was listed properly, down 0.44 percent, ranking the company 55th.



**"We're making
Total Quality
an obsession
at Westinghouse."**



**"I intend to make Total
Quality the driving force
of our long-term competitive
success. We're doing things
continuously to make us
clearly the world leader in
quality as it applies to design
technology, manufacturing
technology and long-term
relationships with our
customers."**

The Top 100 electric utilities' 1988 operating performances

Henry Stein
Engineering Editor

Electric demand in the United States continues to grow along with the Gross National Product (GNP), although at a slightly different rate than previously. Consequently, more and more is being expected from the country's electric utilities. But the public and government at all levels seem to be far less willing to give those same utilities what they ask for to produce and supply these mounting power needs.

Caught between a rock and...

In addition, the industry's fixed costs of building and operating generation capacity have increased. A large part of this increase for utilities that recently completed nuclear plants is due to the costs of those facilities, notes the report "Electric Power Trends" from Arthur Andersen & Co. and Cambridge Energy Research Associates. However, new coal plants also cost more, in part, because of tightened air-pollution regulations and their enforcement.

The Andersen-Cambridge report also brings the lowered price of oil into the economics picture for the energy industry. The paper notes that if oil prices had remained steady or continued to rise, as they had been doing in the '70s, the utility industry would have been well-positioned to provide comparatively low-cost power from its coal and nuclear plants. When oil prices not only stopped climbing but actually started falling in the early '80s, the utilities' economic position then was considerably weakened.

Results of being caught there

The consequences of these factors can be readily seen in the results listed by the Top 100 electric utilities listed here. Their peak demand increased by 5.2 percent in 1988, while total system capability only went up by 1.0 percent, and the overall system reserve margin decreased from 22 percent in '87 to less than 18 percent in '88 (Table 2).

Already in June, the effects of this shortfall were seen, as power reductions took place in the Atlantic States (see "Did summer shortages begin?", p.35). More problems have been predicted for this area and New England, in particular.

Then Potomac Edison also reported reducing voltage on its electrical system by 5 percent on June 27, saying the reduction was caused by demand for energy from the other mid-Atlantic utility customers.

The United States Energy Association (USEA) sounded another warning note. In its "3rd Annual Assessment of the United States Energy Policy and Prospects," the organization called for a reduction of U.S. dependence on foreign oil supplies to decrease our vulnerability to disruptions of those supplies, as was experienced in 1973. Among USEA's suggestions were to deploy clean-coal technologies, construct additional electric power plants, reinstitute the nuclear option and expand use of renewable energy.

The association of about 100 energy-related organizations, corporations, government agencies, universities and professional societies also recommended expanded federal, academic and corporate support for energy-related research and development, and for policy changes to reduce regulatory and judicial delays for energy projects.

Nuclear, still up

Speaking of nuclear options, according to the U.S. Council for Energy Awareness (USCEA), six new units began commercial operation in the United States in 1988. Meanwhile, five new units started up in France, three in West Germany, two in Spain and one in South Korea, which brought the year-end total to 417 operating nuclear plants in 25 countries.

Now the organization is trying to assess the present and possible future effects of the closing of the Rancho Seco generating plant in California and the probable shutdown of the Shoreham plant on Long Island before the latter even began commercial operation. Are these straws in the wind or isolated instances?

Baseload, still down

Looking at a broader industry viewpoint, the Utility Data Institute (UDI) reports that the total number of new power plants being built for regulated electric utilities continued to decline last year. UDI points out that, on the average, utilities had been adding 20,000 MW of new steam-electric capacity annually to the national grid since the 1960s. But in 1988 slightly less than 10,000 MW of new capacity was placed online, and 1989 was projected to add only 6500 MW.

Projections by UDI through the year 1995 foresee less than 5000 MW of new plant per year for utility-owned generating capacity.

And the majority of new plants are not considered to be baseload capacity but are peaking gas turbines, combustion

turbines or internal combustion units that burn gas and/or oil.

Not enough

During the same time period, UDI predicts approximately 3000-4000 MW will be added by nonutility power plant developers. Obviously, this will not make up the difference between additions during 1989-95 and those of the 1960-early 1980s time period.

The previous information is part of the story. What the EL&P Top 100 did is the other part.

TABLE 1.
FOSSIL FUEL CONSUMPTION

	1987	Change	1988	Change
Coal (million tons)	718	+29.7%	529	-35.7%
Oil (million bbl)	171	-15.7%	226	+24.3%
Gas (billion cu ft)	2,176	+4.5%	2,264	+3.9%

TABLE 2.
PEAK DEMAND AND RESERVE MARGINS

	1987	Change	1988	Change
Seasonal Peak (MW)	379,475	-3.0%	399,275	+5.2%
Total System Capability (MW)	481,573	-6.0%	495,982	+1.0%
System Reserve Margin	22.0%		17.7%	
Total Owned Capability (MW)	439,899	-5.1%	439,230	-0.4%
Owned Reserve Margin	18.0%		8.5%	
Average Load Factor	57.1		56.7	

TABLE 3.
TYPE OF GENERATION (MW)

Type	1987	Change	1988	Change
Conventional Steam & Combined Cycle	330,201	-3.4%	325,987	-1.4%
Hydro & Pumped Storage	22,022	-3.1%	22,372	+1.6%
Gas Turbines & Internal Combustion	24,729	+3.9%	30,313	+22.2%
Nuclear	87,134	+3.7%	89,072	+2.1%
Total	464,086	-1.8%	467,744	+0.8%

The main energy problem in the United States is illustrated in Table 2, which shows peak demand and reserve margins. Once more, both system capability and owned reserve margin for the Top 100 dropped—in this case from 22 percent in 1987 to about 18 percent in 1988 and 16 percent to less than 7 percent, respectively.

And, as mentioned, seasonal peaks climbed by more than 5 percent in 1988, exacerbating the situation.

Another factor, of course, was the "abnormally" hot summer. Was it really abnormally hot, or was it a harbinger of things to come, as those who espouse the Greenhouse Effect theory declare? By the time this appears at your desks, we may have an indication of the answer to this pressing question.

Note, too, the shift in the type of generation plant at those reporting (Table 3). The proportion of conventional-steam and combined-cycle generation declined by almost 1.4 percent among them, while nuclear, in spite of added plant, also declined by more than 1.5 percent.

As expected, gas turbines and internal combustion units were in the plus column, making up approximately 13-percent more of 1988's total capacity. This direction continued the trend reported on last year.

The surprise was in fossil-fuel consumption (Table 1). Oil use by those Top 100 investor-owned utilities reporting to EL&P climbed by 24 percent in 1988, as might be expected, after seeing a 16-percent drop in usage between 1986 and 1987. Gas burning for generation also went up, by 4 percent in 1988 compared to 1987—another confirmation of an expected trend.

But here's where the surprise lay—coal use showed a precipitous drop of about 35 percent; this after an increase in 1987 of nearly 30 percent.

This result does not fit in with other figures given for 1988. For instance, the Edison Electric Institute reported a 5-percent increase in utility coal usage for 1988. Consequently, caution is advised in taking the coal usage figures in this report at face value. The reason for the error(s), if there is an error herein, has not turned up yet.

However, EEI does closely match the number for change in oil usage—EL&P found an increase, as mentioned, of approximately 24 percent over 1987, while EEI reported an increase of a little over 25 percent.

The two reports also differed, though not as greatly as with coal, in reported changes in gas usage. EL&P totalled its

group as using 4-percent more gas in 1988, but EEI saw a drop of about 7 percent.

Heat rate change

The median net heat rate for 1988 reported by the Top 100 was 10,569 Btu/kWh. This number compares to a median for 1987 of 10,564, not a statistically significant change, but a small and unwelcome reversal in direction when compared to the median rate for 1986 of 10,610 Btu/kWh.

The 1986 figure had marked the first reversal in climbing heat rates in five years. Now that reversal has itself been reversed as the median thermal efficiency went back up. Here is a trend that should be watched very closely.

The listings of the individual Top 100 investor-owned utilities and their heat rates (Table 6) show what can happen in one, short year.

Green Mountain Power not only left first place, but went down to the Number 22 spot in the list. By doing so, the company let Commonwealth Energy System move from No. 2 to No. 1 and American Electric Power go from 3rd to second place.

New York State Electric & Gas jockeyed from No. 6 to No. 3, United Illuminating leaped from sixth to fourth, and Potomac Electric Power jumped from No. 13 in last year's report to the fifth niche in this one.

Fossil rate movement

Commonwealth Energy not only claimed the Numero Uno system heat

**TABLE 4.
TOP GENERATING UNITS
BY HEAT RATE
(capac. factor > 50%)**

Rank & Unit	Capacity (MW)	Utility	Heat Rate (Btu/kWh)
1. Comanche-1	260	Central & South West	8,884
2. Bellevue Creek-2	1,120	Duke Power	8,933
3. Canal-1	572	Commonwealth Energy	9,016
4. Marshall-4	660	Duke Power	9,029
5. Bellevue Creek-1	1,120	Duke Power	9,085
6. Trenton Chnl.-9	500	Detroit Edison	9,125
7. Sporn-5	450	American Electric Power	9,210
8. Campbell-3	719	CMS Energy	9,226
9. Marshall-1	385	Duke Power	9,232
10. Amos-2	800	American Electric Power	9,267
11. Somerset-1	684	New York State Elec. & Gas	9,286
12. Marshall-3	660	Duke Power	9,292
13. Cardinal-1	600	American Electric Power	9,310
14. Amos-1	800	American Electric Power	9,326
15. Monroe-3	750	Detroit Edison	9,332
16. Brayton Pt.-2	251	New England Electric	9,345
17. Bowen-4	973	Southern Co.	9,348
18. Crystal River-5	717	Florida Progress	9,351
19. Big Sandy-2	800	American Electric Power	9,355
20. Brayton Pt.-1	252	New England Electric	9,359

Company	Rank	Heat Rate (Btu/kWh)	Up or Down	Percent Change In			Coal	Oil	Gas
				Coal (1000 tons)	Oil (1000 bbl)	Gas (1000 MCF)			
Commonwealth Energy System*	1	9,578	D	0	8,065	2,312	0	30	-52
American Electric Power*	2	9,864	D	41,858	0	0	10	0	-100
New York State Electric & Gas	3	9,881	D	6,106	28	0	3	33	0
United Illuminating	4	9,889	D	861	6,211	43	9	10	-99
Potomac Electric Power	5	9,907	D	6,906	4,559	1,568	7	77	-77
Allegheny Power System*	6	9,938	U	16,781	0	0	2	0	0
CMS Energy*	7	9,945	D	6,671	1,164	272	3	131	145
Cincinnati Gas & Electric	8	9,976	D	8,419	1,845	205	6	67	177
DPL*	9	9,977	D	5,951	57	49	5	NA	NA
Florida Progress* (FPC)	10	9,985	U	5,835	8,114	2,483	2	-9	-7
New England Electric*	11	9,987	-	3,372	8,916	166	NA	NA	NA
Detroit Edison	12	9,990	D	18,443	1,082	13,136	-5	109	463
Duke Power	13	10,021	D	8,835	151	430	1	-3	140
SCANA Corporation* (SCE&G)	14	10,049	D	4,512	8	1,774	-2	700	575
Boston Edison	15	10,050	D	0	12,343	9,309	0	15	-60
Citicorp*	16	10,091	D	2,205	0	31	-2	0	138
TECO Energy*	17	10,093	D	6,884	73	0	0	11	0
Southern Company*	18	10,094	D	43,123	451	8,125	-2	151	-12
Central Hudson Gas & Electric	19	10,120	D	884	3,659	2,229	114	2	-63
Public Service of Indiana	20	10,125	U	10,755	0	0	-1	NA	0
Southwestern Public Service	21	10,152	U	7,911	3	28,323	10	0	9
Green Mountain Power	22	10,166	U	16 ²	122	441	-30	8	-23
Niagara Mohawk Power	23	10,211	D	3,058	11,980	12,103	9	67	-55
Union Electric	24	10,265	D	10,894	51	543	6	28	-5
Orange & Rockland Utilities	25	10,304	D	453	1,902	11,847	212	9	-21
Dominion Resources*	26	10,324	D	10,110	4,269	1,084	2	-3	-57
Central & South West*	27	10,340	D	15,885	79	196,060	34	-38	-2
Pennsylvania Power & Light	28	10,348	D	10,776	7,066	0	-1	1	0
Kentucky Utilities	29	10,368	D	6,127	6,519	0	8	152	0
FPL Group* (FPL&L)	30	10,393	D	552	26,277	96,071	100	31	-28
General Public Utilities*	31	10,397	U	7,482	2,062	16,256	1	389	-26
Southern California Edison	32	10,405	D	5,759	4,563	170,731	10	239	-8
IPALCO Enterprises*	33	10,415	D	5,911	71	0	3	37	0
Midwest Energy*	34	10,416	D	2,020	6	1,636	7	-82	5
Atlantic Energy*	35	10,420	U	1,129	1,433	770	4	-1	-77
Gulf States Utilities	36	10,434	D	1,950	302	155,563	-1	37	-2
Duquesne Light	37	10,449	-	4,551	64	205	0	0	0
Baltimore Gas & Electric	38	10,458	D	4,714	2,430	3,512	16	0	-15
Illinois Power	39	10,472	U	6,773	159	738	-8	894	65
Long Island Lighting	40	10,476	D	0	19,922	28,281	0	11	17
Idaho Power	41	10,484	D	3,166	1	0	12	0	NA
Louisville Gas & Electric	42	10,498	U	4,016	0	221	0	0	784
Wisconsin Power & Light	43	10,499	D	3,649	22	365	-5	16	64
Carolina Power & Light	44	10,502	U	8,919	61	4,233	4	510	2319
Consolidated Edison	45	10,540	D	0	24,264	81,426	0	31	-4
Northern Indiana Public Service	46	10,555	U	6,247	2,938	140	28	13255	-84
Central Maine Power	47	10,558	-	0	2,999	0	0	0	0
Portland General*	48	10,561	D	1,508	0	0	69	0	0
Sierra Pacific Power	49	10,562	D	900	742	4,224	-12	91	182
Ohio Edison	50	10,569	D	11,552	0	28	7	NA	0
Philadelphia Electric	51	10,569	D	3,139	4,986	0	5	-2	NA
Public Service Enterprise Group*	52	10,606	D	3,988	5,895	35,369	3	89	-30
Utilicorp United	53	10,614	D	1,573	26	195	24	1200	1293
Public Service of New Hampshire	54	10,620	NA	1,221	4,986	0	NA	NA	NA
Central Louisiana Electric	55	10,631	U	2,222	0	26,043	22	0	-10
Rochester Gas & Electric	56	10,651	D	664	935	29	7	60	-61
El Paso Electric	57	10,659	D	431	0	19,504	0	0	3
Hawaiian Electric*	58	10,662	U	0	12,576	0	0	7	0
Iowa Southern*	59	10,665	D	1,390	17	0	8	-60	0
Central Vermont Public Service	60	10,665	D	31 ²	61	0	-28	-3	0
Pinnacle West Capital*	61	10,669	D	6,055	0	5,922	1	NA	28
St. Joseph Light & Power Co.	62	10,683	-	585	21	214	NA	NA	NA
Public Service of Colorado	63	10,707	D	6,591	28	336,526	7	-7	207
San Diego Gas & Electric	64	10,716	U	NA	1,626	38,937	NA	523	-26
Northern States Power	65	10,719	D	10,850	146	2,346	14	62	12
Kansas City Power & Light	66	10,733	U	5,959	74	185	0	12	49
Wisconsin Public Service	67	10,738	U	3,502	24	562	3	-17	115
Oklahoma Gas & Electric	68	10,742	D	6,391	14	94,086	1	0	-4
Iowa Resources*	69	10,769	D	1,975	10	724	7	-29	38
Southern Indiana Gas & Electric	70	10,794	U	2,560	0	211	17	0	23
Central Illinois Public Service	71	10,796	U	4,485	44	0	-1	42	0
Middle South Utilities* ¹	72	10,802	U	7,645	1,582	182,986	2	668	-8
Pacificorp	73	10,810	D	14,149	66	0	14	6	0
Iowa-Illinois Gas & Electric	74	10,861	U	2,652	9	515	8	-31	-1
Montana Power (Entech)	75	10,869	D	4,096	27	276	27	145	-41
Tucson Electric Power	76	10,871	D	2,243	0	2,277	21	0	-31
Texas Utilities*	77	10,941	D	29,676	577	360,777	2	48	1
Minnesota Power	78	10,948	U	4,114	0	0	16	0	-100
Madison Gas & Electric	79	10,987	-	795	4	580	1	0	12
Kansas Gas & Electric	80	11,033	U	2,972	106	7,897	-6	NA	37
Commonwealth Edison	81	11,037	U	10,209	1,969	1,140	-18	-38	252
Nevada Power	82	11,054	U	2,555	202	4,649	8	153	21
Public Service of New Mexico	83	11,132	D	3,485	308	1	1	7600	-100
Puget Sound Power & Light	84	11,172	U	3,539	NA	NA	NA	NA	NA
Empire District Electric	85	11,274	U	1,806	18	68	64	157	-61
KPL Gas Service	86	11,308	D	6,251	12	2,484	5	-33	16
Interstate Power	87	11,399	U	1,980	14	2,645	4	56	189
IE Industries*	88	11,409	U	1,089	20	463	1	-9	47
Houston Industries*	89	11,423	U	15,477	403	271,015	-2	160	3
Oter Tail Power	90	11,639	D	1,995 ²	1,722	0	33	57300	0
MDU Resources Group, Inc.	91	12,019	NA	1,511	7	15	NA	NA	NA
Centel*	92	12,262	U	877	9	4,357	-3	29	8
TNP Enterprises* (Tex-NM Power)	93	NA	NA	0	0	6	0	0	200
Washington Water Power	94	NA	NA	1,804	7	5	24	250	67
Delmarva Power & Light	95	NA	NA	2,789	4,394	2,904	0	50	-46
Eastern Utilities Associates*	96	NA	NA	472	5,797	0	-11	104	NA
Centerior Energy*	97	1988 INFORMATION NOT PROVIDED						NA	NA
Northeast Utilities*	98	1988 INFORMATION NOT PROVIDED						NA	NA
Pacific Gas & Electric	99	1988 INFORMATION NOT PROVIDED						NA	NA
Wisconsin Energy*	100	1988 INFORMATION NOT PROVIDED						NA	NA

*Holding company
NA Not available

¹Middle South Utilities is now Entergy Corp.
0 (in change columns), less than 1% change and/or zero amounts in both years

²Coal = Wood

³Lignite only

Company	Season Peak (MW)	Change (%)	Winter (W) or Summer (S)	Total System Capacity at Time of Peak (MW)	Total System Reserve (%)	Owned Capacity At Peak (MW)	Owned Reserve (%)	Load Factor (%)
Allegheny Power System*	6,045	6.9	W	7,888	26	7,906	31	70.0
American Electric Power*	17,164	10.3	S	21,910	28	22,243	30	85.4
Atlantic Energy*	1,636	2.1	S	1,807	10	1,537	-6	55.9
Baltimore Gas & Electric	5,381	3.7	S	5,930	10	5,417	1	54.6
Boston Edison	2,626	6.0	S	3,177	21	2,025	-23	60.5
CMS Energy*	5,869	8.7	S	6,370	9	6,361	8	61.7
Carolina Power & Light	8,078	7.5	S	9,529	18	8,981	11	57.4
Centel*								
Centerior Energy*								
Central & South West*	10,138	4.9	S	13,634	34	13,563	34	55.9
Central Hudson Gas & Electric	891	8.1	S	1,141	28	1,091	22	62.9
Central Illinois Public Service	1,724	5.6	S	2,428	41	2,680	55	53.1
Central Louisiana Electric	1,123	-1.6	S	1,706	52	1,686	50	53.3
Central Maine Power	1,454	-0.1	W	1,793	23	959	-34	71.8
Central Vermont Public Service	400	1.5	W	475	19	114	-72	68.6
Cilcorp*	1,120	12.8	S	1,121	0	1,136	1	52.3
Cincinnati Gas & Electric	3,996	12.3	S	4,190	5	4,030	1	55.2
Commonwealth Edison	17,459	11.3	S	22,521	29	22,521	29	51.1
Commonwealth Energy System**	907	6.6	W	1,007	11	225	-75	59.4
Consolidated Edison	8,617	8.7	S	10,097	17	9,196	7	51.5
DPL*	2,585	10.6	S	2,642	2	2,642	2	58.1
Delmarva Power & Light	2,204	5.8	S	2,277	3	2,277	3	57.9
Detroit Edison	9,133	8.4	S	10,038	10	9,981	9	55.2
Dominion Resources*	11,756	2.0	S	12,833	9	11,471	-2	56.6
Duke Power	13,618	7.3	S	15,774	16	15,533	14	59.8
Duquesne Light	2,280	0.0	S	2,457	8	2,662	17	59.1
Eastern Utilities Associates*	813	4.0	S	942	16	575	-29	60.3
El Paso Electric	1,002	2.8	S	1,497	49	1,001	0	67.3
Empire District Electric	624	2.3	S	725	16	643	3	52.6
FPL Group* (F&P)	12,382	-0.1	S	12,137	-2	13,331	8	59.5
Florida Progress* (FPC)	6,188	19.1	W	6,049	-2	6,125	-1	47.6
General Public Utilities*	7,987	9.2	S	8,760	10	6,775	-15	NA
Green Mountain Power	303	1.3	W	347	15	132	-56	65.0
Gulf States Utilities	4,910	-1.6	S	6,805	39	6,628	35	66.6
Hawaiian Electric*	1,321	4.5	W	1,553	18	1,511	14	72.0
Houston Industries*	10,422	1.2	S	13,675	31	12,855	23	60.0
IE Industries*	1,049	7.3	S	1,142	9	1,052	0	54.4
IPALCO Enterprises*	2,475	9.2	S	2,845	15	2,845	15	54.7
Idaho Power	2,161	3.9	S	2,482	15	2,417	12	64.0
Illinois Power	3,775	22.4	S	4,299	14	4,449	18	53.9
Interstate Power	919	11.8	S	NA	-100	951	3	57.7
Iowa Resources*	1,373	7.6	S	1,506	10	1,131	-18	46.3
Iowa Southern*	513	8.5	S	601	17	600	17	49.9
Iowa-Illinois Gas & Electric	1,078	5.0	S	1,262	17	1,392	29	51.2
KPL Gas Service	2,031	5.9	S	2,378	17	2,526	24	48.4
Kansas City Power & Light	2,656	4.9	S	2,992	13	2,992	13	46.8
Kansas Gas & Electric	1,657	1.4	S	2,410	45	2,430	47	52.5
Kentucky Utilities	2,767	13.5	S	3,010	9	3,107	12	55.5
Long Island Lighting	3,822	6.9	S	NA	NA	NA	NA	NA
Louisville Gas & Electric	2,141	15.7	S	2,263	6	2,263	6	50.0
MDU Resources Group	387	NA	S	451	17	410	6	54.0
Madison Gas & Electric	477	0.0	S	587	23	589	23	53.0
Middle South Utilities**	11,442	1.5	S	15,086	32	15,480	35	58.0
Midwest Energy*	969	10.0	S	1,043	8	1,182	22	47.6
Minnesota Power	1,181	5.7	W	1,584	32	1,272	8	84.0
Montana Power (Entech)	1,900	53.6	W	1,725	-9	1,285	-32	70.0
Nevada Power	1,883	8.2	S	2,163	15	1,741	-8	47.1
New England Electric*	4,107	NA	S	4,919	20	3,893	-5	64.3
New York State Electric & Gas	2,574	1.7	W	3,058	19	2,673	4	63.5
Niagara Mohawk Power	6,220	7.6	W	7,340	18	5,514	-11	66.7
Northeast Utilities*								
Northern Indiana Public Service	2,457	5.7	S	3,396	38	3,396	38	62.4
Northern States Power	6,923	8.6	S	7,823	13	6,753	-2	54.5
Ohio Edison	5,027	9.8	S	6,407	27	6,162	23	65.6
Oklahoma Gas & Electric	4,423	-4.5	S	5,948	34	5,703	29	48.7
Orange & Rockland Utilities	971	8.9	S	1,093	13	1,020	5	40.4
Otter Tail Power	551	14.1	W	738	34	626	14	61.7
Pacific Gas & Electric								
Pacificorp	4,242	2.5	W	5,458	29	3,997	-6	67.0
Pennsylvania Power & Light	5,566	-0.4	W	7,479	34	8,360	50	82.0
Philadelphia Electric	6,826	4.3	S	6,294	-8	7,762	14	58.0
Pinnacle West Capital*	3,336	6.7	S	4,284	28	4,030	21	63.5
Portland General*	2,893	3.0	W	4,236	46	2,695	-7	59.8
Potomac Electric Power	5,211	1.1	S	5,675	9	5,375	3	52.7
Public Service Enterprise Group*	8,745	7.0	S	10,019	15	9,833	12	51.5
Public Service of Colorado	3,362	1.9	S	3,723	11	2,624	-22	70.1
Public Service of Indiana	4,401	12.4	S	5,881	33	5,627	28	55.4
Public Service of New Hampshire	1,416	NA	W	1,681	19	1,313	-7	59.3
Public Service of New Mexico	956	4.4	S	1,583	66	1,571	64	71.6
Puget Sound Power & Light	3,638	3.1	W	4,105	13	1,848	-49	55.0
Rochester Gas & Electric	1,275	5.8	S	1,403	10	1,057	-17	60.0
SCANA Corporation* (SCE&G)	1,275	-56.7	S	1,403	10	1,057	-17	60.0
San Diego Gas & Electric	2,831	19.0	S	3,275	16	2,602	-8	31.2
Sierra Pacific Power	908	11.7	W	1,116	23	836	-8	64.3
Southern California Edison	15,987	9.5	S	19,423	21	14,077	-12	55.8
Southern Company*	23,641	4.4	S	26,539	12	27,893	17	59.8
Southern Indiana Gas & Electric	1,024	10.8	S	1,167	14	1,167	14	62.4
Southwestern Public Service	2,830	0.4	S	4,251	50	4,051	43	64.4
St. Joseph Light & Power Co.	323	NA	S	361	12	336	4	48.4
TECO Energy*	2,620	9.1	S	2,801	7	3,027	16	56.1
TNP Enterprises* (Tex-NM Power)	NA	NA	NA	NA	NA	NA	NA	NA
Texas Utilities*	17,620	5.6	S	20,115	14	18,389	4	55.1
Tucson Electric Power	1,230	5.0	S	1,199	-3	1,330	8	58.9
Union Electric	6,978	2.1	S	7,710	10	7,473	7	52.9
United Illuminating	1,132	5.6	S	1,271	12	1,172	4	56.1
Utilicorp United	969	35.0	S	1,024	6	923	-5	47.8
Washington Water Power	1,359	0.8	W	1,755	29	1,465	8	56.0
Wisconsin Energy*								
Wisconsin Power & Light	1,819	11.3	S	1,829	1	1,912	5	59.0
Wisconsin Public Service	1,510	9.3	S	1,704	13	1,096	12	70.2

NA Not Available
*Holding Company

¹Middle South Utilities now Entergy Corp.
²Peak figures do not include Canal Electric

rate position for itself but also showed how good a job its operators were doing by being second only to Duke Power in best heat rate for fossil-fueled boilers (Table 5). In overall second place, American Electric Power was edged out of third fossil-fueled, heat-rate placement by CMS Energy's Consumers Power. And Florida Progress took the fifth-best fossil-fueled position while falling into the tenth spot overall.

The top unit operating more than 50-percent of the time and with the lowest heat factor was Central & Southwest's Comanche 1 (Table 5). Next in line was Duke's Belews Creek 2, followed by Commonwealth Energy's Canal 1.

But a significant story is that a Duke unit not only took second place here, other Duke units came in at four and five, and the company grabbed five of the top 20 slots. Not to be outdone by much, American Electric Power's generating units also were in five of these top 20. No other utility came close to these two in this category.

Caution, coal use

In last year's totals, coal usage by the Top 100 showed an overall increase of 2.5 percent; yet as reported, this year's figures for 1988 showed a drop of about 35 percent. Much of this drop can be seen at individual utilities in the list that reduced their reported coal consumption. Another factor entering into the drop is that not as many utilities reported their figures to EL&P as did for 1987's report.

The major burners of coal in 1988 were:

- *Southern Co.—even though its consumption was down in 1988 by 12 percent to 43-million tons from 1987's 44-million tons.
- *American Electric Power—up 10 percent at approximately 42-million tons.
- *Texas Utilities—added 2 percent to its coal consumption in 1988, to a level of 30-million tons.
- *Fourth was Detroit Edison—with 18-million tons consumed, for a reduction of 5 percent.
- *Fifth was Allegheny Power System—about 17-million tons consumed and a small 2-percent increase.
- *Central & South West—used 34-percent more coal, amounting to 16-million tons.
- *Houston Industries—took nearly 16-million tons as it reduced coal consumed by about 2 percent.
- *PacifiCorp—reported a little more than 14-million tons of the solid, black fuel burned in its plants for a 14-percent increase.
- *Ohio Edison—used 7-percent more coal in 1988, a total of almost 12-million tons.
- *No. 10 was Union Electric—approximately 11-million tons fed its appetite that grew by 6 percent in 1988.

Trouble ahead? Oil use

The touchy subject of increased oil usage by electric utilities—who are definitely not the only ones using a larger percentage of oil—caused concern within and without the industry itself.

Proponents of nuclear and renewable energy sources used this sharp increase to push for their candidates. Neither appeared to get very far with either the federal government or the populace at large.

The troubles of the nuclear industry are well known. Less well-known are the cutbacks in funding for the various forms of renewable energy such as solar power and wind-generated power.

More biomass-burning plants are being built, but they, too, have had their share of problems. And they are still a very minor factor in the overall energy equation.

The Top 100 reporting totted up an increase in oil consumption in 1988 of a show-stopping 24 percent. EEI pretty well confirmed this figure with its own data showing a 26-percent leap in oil usage by the industry.

Some selected figures of the largest oil users in the electric generating field are:

- The largest reported user was FPL Group, which, at more than 27-million barrels consumed in 1988, showed an increase of 31 percent over 1987.

- Next in line came Consolidated Edison at a rate over 24-million barrels, a 31-percent increase over the year before.

Third was troubled Long Island Lighting, a company that used approximately 20-million barrels of "black gold." This increased its amount by 37 percent over the prior year's figure.

- To the west, the far west, Hawaiian Electric had to burn close to 12-million barrels to keep the luaus going and the lights at Waikiki burning.

- Back way east, Boston Edison consumed more than 12-million barrels of oil to maintain Beacon Hill and its song-feted transit system running.

- Further north and west, Niagara Mohawk Power used just under that 12-million figure for its generation.

After these, the amounts dropped off rapidly, but the picture of higher consumption was clear already.

Overall, the utilities listed here increased their usage of natural gas by 4 percent in 1988. Since federal agencies and the gas industry report such large reserves of this commodity in the United States, this could be considered an encouraging trend.

One reason for the increase may be

**TABLE 5.
TOP SYSTEM HEAT RATES,
FOSSIL-FUELED BOILERS**

Utility	Heat Rate (Btu/kWh)
1. Duke Power	9,327
2. Commonwealth Energy	9,567
3. CMS Energy	9,639
4. American Electric Power	9,749
5. Florida Progress	9,803
6. NY State Elec. & Gas	9,848
7. Potomac Electric Power	9,883
8. United Illuminating	9,887
9. Detroit Edison	9,890
10. Southern Companies	9,905

Company	Fossil			Hydro & Pump Storage			Diesel/Combustion			Nuclear			Miscellaneous	
	(MW)	(%)	Last Year Change (MW)	(MW)	(%)	Last Year Change (MW)	(MW)	(%)	Last Year Change (MW)	(MW)	(%)	Last Year Change (MW)	(MW)	(%)
Allegheny Power System*	7,004	89	-85	902	11	0	0	0	0	0	0	0	0	0
American Electric Power*	19,539	87	0	788	4	-48	18	0	-43	2,130	9	0	0	0
Atlantic Energy*	797	52	-152	0	0	0	368	24	0	373	24	-158	0	0
Baltimore Gas & Electric	4,741	87	1650	0	0	0	717	13	0	0	0	-1650	0	0
Boston Edison	1,806	89	99	0	0	0	218	11	-21	0	0	-670	0	0
CMS Energy*	4,152	65	0	1,023	16	-66	385	6	38	822	13	19	0	0
Carolina Power & Light	5,068	56	0	218	2	0	1,018	11	0	2,676	30	0	0	0
Centel*	1988 INFORMATION NOT PROVIDED													
Centerior Energy*	1988 INFORMATION NOT PROVIDED													
Central & South West*	12,645	92	-914	0	0	0	674	5	674	315	2	315	159	1
Central Hudson Gas & Electric	908	83	7	43	4	0	43	4	5	97	9	97	0	0
Central Illinois Public Service	2,677	100	-19	0	0	0	3	0	0	0	0	0	0	0
Central Louisiana Electric	1,681	100	0	0	0	0	0	0	0	0	0	0	0	0
Central Maine Power	549	57	0	337	35	0	44	5	0	29	3	0	0	0
Central Vermont Public Service	22	19	1	41	36	0	31	27	-1	20	18	1	0	0
Cilcorp*	1	97	0	0	0	0	30	3	-2	0	0	0	0	0
Cincinnati Gas & Electric	3,579	88	24	0	0	0	475	12	0	0	0	0	0	0
Commonwealth Edison	9,703	43	0	0	0	-312	1,331	6	0	11,487	51	1120	0	0
Commonwealth Energy System*	1,027	95	0	0	0	0	59	5	-3	0	0	0	0	0
Consolidated Edison	6,323	68	150	0	0	0	2,076	22	0	849	9	0	0	0
DPL*	2,459	93	-9	0	0	0	183	7	0	0	0	0	0	0
Delmarva Power & Light	1,788	79	0	0	0	0	168	7	0	321	14	0	0	0
Detroit Edison	7,455	76	-344	917	9	153	525	5	0	913	9	913	0	0
Dominion Resources*	6,062	54	11	1,591	14	1	439	4	0	3,179	28	-1	0	0
Duke Power	6,428	41	0	1,452	9	0	599	4	0	7,054	45	-116	0	0
Duquesne Light	2,122	74	0	0	0	0	66	2	0	664	23	0	0	0
Eastern Utilities Associates*	508	85	-1	0	0	0	47	8	0	46	8	0	0	0
El Paso Electric	828	55	0	0	0	0	69	5	0	602	40	201	0	0
Empire District Electric	435	64	2	16	2	0	227	33	33	0	0	0	0	0
FPL Group* (FP&L)	8,441	62	125	0	0	0	2,572	17	-24	2,885	21	0	0	0
Florida Progress* (FPC)	4,195	68	-329	0	0	0	1,242	20	90	688	11	-113	0	0
General Public Utilities*	3,690	51	9	307	4	0	1,847	25	-138	1,480	20	-874	0	0
Green Mountain Power	13	8	-1	36	23	0	105	68	0	0	0	0	0	0
Gulf States Utilities	5,628	90	-200	0	0	0	0	0	0	655	10	0	0	0
Hawaiian Electric*	1,264	84	-4	0	0	0	246	16	20	0	0	0	0	0
Houston Industries*	11,464	86	19	0	0	0	1,410	11	0	385	3	385	0	0
IE Industries*	350	40	-164	0	0	0	167	19	11	350	40	0	0	0
IPALCO Enterprises*	2,771	97	0	0	0	0	74	3	0	0	0	0	0	0
Idaho Power	991	36	-1	1,742	63	7	50	2	0	0	0	0	0	0
Illinois Power	3,340	78	0	2	0	0	138	3	-12	806	19	0	0	0
Interstate Power	896	99	0	0	0	-55	11	1	11	0	0	0	0	0
Iowa Resources*	854	76	0	0	0	0	275	24	0	0	0	0	0	0
Iowa Southern*	574	99	0	0	0	0	6	1	0	0	0	0	0	0
Iowa-Illinois Gas & Electric	907	65	-49	3	0	1	97	7	-17	385	28	1	0	0
KPL Gas Service	2,192	87	23	0	0	0	334	13	-2	0	0	0	0	0
Kansas City Power & Light	2,075	69	38	0	0	0	387	13	17	530	18	0	0	0
Kansas Gas & Electric	1,896	78	2	0	0	0	3	0	0	530	22	0	0	0
Kentucky Utilities	3,087	97	-20	24	1	0	59	2	0	0	0	0	0	0
Long Island Lighting	2,515	67	2515	0	0	0	1,250	33	1250	0	0	0	0	0
Louisville Gas & Electric	2,134	95	0	0	0	0	108	5	0	0	0	0	0	0
MDU Resources Group	351	84	NA	0	0	NA	65	16	NA	0	0	NA	0	0
Madison Gas & Electric	409	69	0	0	0	0	87	15	0	93	16	-1	0	0
Middle South Utilities**	12,108	73	0	70	0	0	572	3	-18	3,796	23	0	0	0
Midwest Energy*	985	83	-50	0	0	0	197	17	-3	0	0	0	0	0
Minnesota Power	1,157	91	-12	114	9	5	0	0	0	0	0	0	0	0
Montana Power (Entech)	970	65	0	520	35	0	4	0	0	0	0	0	0	0
Nevada Power	1,312	75	0	0	0	0	429	25	0	0	0	0	0	0
New England Electric*	2,617	66	2617	1,160	29	1160	56	1	56	141	4	141	0	0
New York State Electric & Gas	2,405	90	19	67	3	-1	7	0	0	194	7	194	0	0
Niagara Mohawk Power	3,546	64	-1	676	12	-1	237	4	0	1,054	19	444	0	0
Northeast Utilities*	1988 INFORMATION NOT PROVIDED													
Northern Indiana Public Service	3,145	93	0	10	0	0	241	7	0	0	0	0	0	0
Northern States Power	3,846	57	-7	226	3	3	1,127	17	3	1,549	23	-15	0	0
Ohio Edison	4,647	78	-112	0	0	0	139	2	0	1,185	20	0	0	0
Oklahoma Gas & Electric	5,644	99	0	0	0	0	59	1	0	0	0	0	0	0
Orange & Rockland Utilities	902	88	0	44	4	0	74	7	0	0	0	0	0	0
Otter Tail Power	534	85	0	4	1	0	87	14	0	0	0	0	0	0
Pacific Gas & Electric	1988 INFORMATION NOT PROVIDED													
Pacificorp	3,122	76	0	976	24	0	0	0	0	27	1	0	0	0
Pennsylvania Power & Light	11,820	82	6035	146	1	0	539	4	0	1,890	13	0	0	0
Philadelphia Electric	2,769	36	0	1,290	17	0	819	11	0	2,883	37	0	0	0
Pinnacle West Capital*	2,181	54	0	6	0	0	754	19	0	0	0	-739	1,108	28
Portland General*	661	25	-76	611	23	0	656	25	0	745	28	0	0	0
Potomac Electric Power	4,809	89	0	0	0	0	566	11	0	0	0	0	0	0
Public Service Enterprise Group*	4,329	43	17	186	2	0	2,763	27	50	2,807	28	-35	0	0
Public Service of Colorado	2,457	82	103	84	3	0	187	6	0	270	9	0	0	0
Public Service of Indiana	5,376	96	0	55	1	0	196	3	0	0	0	0	0	0
Public Service of New Hampshire	1,086	83	1086	68	5	68	119	9	119	32	2	32	0	0
Public Service of New Mexico	1,181	74	-105	0	0	0	20	1	0	390	25	130	0	0
Puget Sound Power & Light	857	19	-1	309	7	-1	3,449	75	2747	0	0	0	0	0
Rochester Gas & Electric	541	44	0	47	4	0	29	2	0	621	50	151	0	0
SCANA Corporation* (SCE&G)	2,286	59	0	756	19	0	259	7	1	590	15	0	0	0
San Diego Gas & Electric	1,841	68	-13	0	0	0	333	12	0	517	19	0	0	0
Sierra Pacific Power	742	89	0	7	1	-1	86	10	-1	0	0	0	0	0
Southern California Edison	8,768	62	-1304	1,154	8	211	1,621	12	1	2,541	18	193	0	0
Southern Company*	21,052	76	-2358	2,592	9	1	1,145	4	14	2,904	10	2904	0	0
Southern Indiana Gas & Electric	1,032	88	0	0	0	0	135	12	0	0	0	0	0	0
Southwestern Public Service	1,080	91	-2865	0	0	0	106	9	0	0	0	0	0	0
St. Joseph Light & Power	276	82	NA	0	0	NA	60	18	NA	0	0	NA	0	0
TECO Energy* 2,894	94	25	0	0	0	188	6	30	0	0	0	0	0	0
TNP Enterprises* (Tex-NM Power)	38	78	0	0	0	0	11	22	0	0	0	0	0	0
Texas Utilities*	17,804	97	0	0	0	0	585	3	585	0	0	0	0	0
Tucson Electric Power	1,113	84	0	0	0	0	217	16	0	0	0	0	0	0
Union Electric	5,388	72	-183	631	8	0	379	5	0	1,118	15	-32	0	0
United Illuminating	1,120	95	-1	0	0	0	19	2	-3	43	4	1	0	0
Utilicorp United	629	68	15	0	0	0	294	32	-2	0	0	0	0	0
Washington Water Power	453	31	109	946	64	0	68	5	-33	0	0	0	0	0
Wisconsin Energy*	1988 INFORMATION NOT PROVIDED													
Wisconsin Power & Light	1,465	77	7	42	2	0	179	9	1	215	11	0	0	0
Wisconsin Public Service	1,270	75	-7	54	3	0	156	9	-3	216	13	0	0	0

NA Not Available

*Middle South Utilities now Entergy Corp.

*Holding Company

TABLE 9. TRANSMISSION AND DISTRIBUTION LINES IN OPERATION

Company	Transmission				Distribution				Underground			
	Below 189 kV (circuit miles)		189 kV & Up (circuit miles)		Overhead		Underground		Below 22 kV (cable miles)		22 kV & Up (cable miles)	
	Miles Added	Miles	Miles Added	Miles	Miles Added	Miles	Miles Added	Miles	Miles Added	Miles	Miles Added	Miles
Allegheny Power System*	3,449	35	1,107	0	49,743	307	4,573	-25	3,512	355	16	4
American Electric Power*	15,795	4	5,926	0	92,408	191	5,591	334	7,035	-16	458	98
Atlantic Energy*	1,168	0	63	-1	6,059	55	0	0	835	42	0	0
Baltimore Gas & Electric	548	12	489	0	NA	NA	732	-12	NA	NA	471	295
Boston Edison	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CMS Energy*	7,933	1	1,918	0	48,293	48293	0	-47944	0	0	6,918	337
Carolina Power & Light	3,111	1	3,029	19	NA	NA	37,837	240	NA	NA	4,730	575
Centel*	0	0	0	0	0	0	6,725 ²	75	0	0	694	140
Centerior Energy*	1988 INFORMATION NOT PROVIDED											
Central & South West*	9,784	-4350	520	-1293	57,605	161	520	7	5,820	85	359	21
Central Hudson Gas & Electric	526	0	76	0	6,403	41	46	0	882	79	0	0
Central Illinois Public Service	4,258	-11	304	-1	8,306	5	0	0	693	20	0	0
Central Louisiana Electric	766	0	353	41	0	0	10,692	-138	0	0	262	-527
Central Maine Power	2,011	-1	207	-1	17,027	-1	295	-1	657	-1	12	0
Central Vermont Public Service	622	0	0	0	7,243	65	0	0	152	16	0	0
Cilcorp*	283	0	47	0	5,593	-7	616	0	1,729	16	6	0
Cincinnati Gas & Electric	1,331	7	383	0	9,024	34	528	5	2,143	148	32	2
Commonwealth Edison	2,442	1	2,553	106	0	0	36,034	107	0	0	23,476	892
Commonwealth Energy System*	295	-5	61	0	3,761	-33	2,016	32	2,524	149	953	99
Consolidated Edison	22	0	409	0	25,366	19	488	6	58,414	111	6,826	104
DPL*	1,345	7	448	0	NA	NA	NA	NA	NA	NA	NA	NA
Delmarva Power & Light	1,123	0	263	0	1,795	20	4,773	-15	943	68	2,295	181
Detroit Edison	4,442	6	973	5	30,122	142	0	0	8,023	407	0	0
Dominion Resources*	2,868	-1	3,000	5	0	0	37,049	172	0	0	15,560	1096
Duke Power	9,336	20	3,100	42	48,698	511	9,414	96	4,842	603	2,385	214
Duquesne Light	512	0	148	0	6,358	0	404	0	2,218	0	426	0
Eastern Utilities Associates*	186	0	178	103	886	2	2,508	-57	250	11	819	24
El Paso Electric	681	12	788	-1	3,138	59	1,456	42	813	71	127	13
Empire District Electric	1,248	22	21	21	4,850	64	0	0	245	10	0	0
FPL Group* (FPL)	2,255	40	3,289	77	0	0	35,963	574	0	0	13,618	894
Florida Progress* (FPC)	2,681	-5	1,557	-29	NA	NA	NA	NA	4,200	296	0	0
General Public Utilities*	4,414	-24	2,183	61	41,132	181	5,478	351	14,095	1394	1,274	-172
Green Mountain Power	281	0	0	0	2,236	22	19	0	274	32	6	0
Gulf States Utilities	3,588	2	1,152	2	18,139	111	1,395	15	1,747	23	109	5
Hawaiian Electric*	1,475	10	0	0	3,944	66	0	0	2,424	37	0	0
Houston Industries*	2,497	9	1,030	37	18,058	84	1,426	25	5,297	949	1,332	133
IE Industries*	3,212	14	66	-1	4,716	1	0	0	1,853	90	0	0
IPALCO Enterprises*	508	-2	454	0	4,679	10	0	0	4,590	263	0	0
Idaho Power	3,074	-111	1,481	0	13,076	60	4,152	31	4,735	105	205	20
Illinois Power	2,321	-26	484	0	16,655	45	1,330	-9	1,154	49	4	0
Interstate Power	2,514	-10	74	0	0	0	NA	NA	376	-172	0	0
Iowa Resources*	1,113	0	345	0	11,359	54	0	0	2,546	148	0	0
Iowa Southern*	932	-17	61	0	31,151	28004	0	0	0	0	461	12
Iowa-Illinois Gas & Electric	669	-20	305	0	4,659	27	0	0	1,203	14	0	0
KPL Gas Service	3,600	22	790	0	12,534	100	0	0	507	22	0	0
Kansas City Power & Light	1,343	-14	294	-1	8,850	34	0	0	5,600	328	0	0
Kansas Gas & Electric	1,593	0	663	0	7,775	32	0	0	2,146	122	0	0
Kentucky Utilities	4,272	129	412	0	14,447	151	0	0	864	52	0	0
Long Island Lighting	1988 INFORMATION NOT PROVIDED											
Louisville Gas & Electric	760	0	131	0	3,320	41	86	-20	2,094	122	0	0
MDU Resources Group	2,831	NA	319	NA	2,825	NA	0	NA	1,748	NA	0	NA
Madison Gas & Electric	179	0	124	0	1,077	0	0	0	673	0	0	0
Middle South Utilities*	7,199	51	2,977	-96	66,730	477	4,761	83	3,551	168	1,704	36
Midwest Energy*	2,145	-14	184	-7	0	0	0	0	NA	NA	NA	NA
Minnesota Power	1,539	2	607	0	5,346	1542	640	-15	967	-4	15	-4
Montana Power (Entech)	5,547	22	1,445	0	12,963	68	0	0	0	-1171	NA	0
Nevada Power	551	0	638	25	2,882	35	0	0	3,457	270	0	0
New England Electric*	2,001	2001	633	633	16,702	16702	804	804	7,311	7311	221	221
New York State Electric & Gas	3,769	-1	813	0	30,641	193	1,973	-26	0	0	0	-1728
Niagara Mohawk Power	8,060	28	1,126	0	0	0	106,520	338	0	0	7,672	311
Northeast Utilities*	1988 INFORMATION NOT PROVIDED											
Northern Indiana Public Service	2,653	3	332	0	7,634	1	0	0	798	56	0	0
Northern States Power	5,474	20	1,470	10	28,098	2864	0	0	11,714	216	0	0
Ohio Edison	4,903	-8	628	1	24,847	73	0	0	3,430	258	0	0
Oklahoma Gas & Electric	3,597	15	982	0	0	20,480	70	0	0	5,707	78	0
Orange & Rockland Utilities	471	0	80	0	4,690	9	0	0	1,061	66	0	0
Otter Tail Power	4,855	0	410	-12	NA	NA	NA	NA	NA	NA	NA	NA
Pacific Gas & Electric	1988 INFORMATION NOT PROVIDED											
Pacificorp	3,543	-71	3,238	0	0	0	28,173	-15	0	0	8,209	357
Pennsylvania Power & Light	0	0	1,308	0	48,903	604	2,401	11	8,145	643	14	0
Philadelphia Electric	337	-21	744	0	11,830	132	61	0	16,700	409	17	0
Pinnacle West Capital*	NA	NA	NA	NA	10,693	8	NA	NA	8,992	441	NA	NA
Portland General*	935	6	1,038	0	7,973	34	0	0	5,127	179	0	0
Potomac Electric Power	26	0	783	0	4,515	-7	319	21	10,760	421	784	46
Public Service Enterprise Group*	270	0	722	0	NA	NA	47	0	25,942	806	2,633	606
Public Service of Colorado	1,606	26	1,315	0	11,522	-8	1,496	14	5,423	118	231	7
Public Service of Indiana	3,996	-4	1,394	0	18,233	-2	0	0	2,565	172	9	9
Public Service of New Hampshire	1,512	1512	260	260	0	0	10,132	10132	0	0	742	742
Public Service of New Mexico	888	0	1,896	0	4,707	4707	0	-4670	2,328	2328	0	-2232
Puget Sound Power & Light	1,853	87	222 ²	5	9,996	-4	144	0	4,546	183	20	0
Rochester Gas & Electric	706	-7	0	0	6,729	5	0	0	4,178	-73	0	0
SCANA Corporation* (SCE&G)	2,409	26	788	0	6,228	96	7,621	168	NA	NA	NA	NA
San Diego Gas & Electric	1,122	4	806	-1	7,298	8	0	0	7,457	433	0	0
Sierra Pacific Power	3,486	3232	0	0	0	0	7,957	7248	0	0	3,014	2758
Southern California Edison	6,581	217	5,326	87	NA	NA	44,680	336	60,360	8407	119	-49
Southern Company*	19,895	196	6,360	115	0	0	92,248	3844	0	0	17,339	2172
Southern Indiana Gas & Electric	860	0	0	0	3,177	-1	0	0	798	27	0	0
Southwestern Public Service	4,020	-1	1,514	39	NA	NA	NA	NA	NA	NA	NA	NA
St. Joseph Light & Power	415	NA	117	NA	2,165	NA	0	NA	133	NA	0	NA
TECO Energy*	804	1	354	0	6,644	47	0	0	1,966	131	0	0
TNP Enterprises* (Tex-NH Power)	2,664	900	40 ²	20	6,408	35	0	0	488	18	0	0
Texas Utilities*	8,874	117	3,634	14	48,194	233	4,143	417	2,230	555	1,365	261
Tucson Electric Power	325	2	1,504	0	7,147	174	521	-6	3,217	78	0	-33
Union Electric	2,201	-22	988	0	20,485	146	4,000	28	8,993	543	358	-2
Unitil Illuminating	91	0	6	0	3,094	23	0	0	1,089	32	0	0
Utilicorp United	1229	0	58	0	6,717	2001	104	104	720	194	0	0
Washington Water Power	1,507	0	657	-10	8,686	-11	588	0	1,430	62	0	0
Wisconsin Energy*	1988 INFORMATION NOT PROVIDED											
Wisconsin Power & Light	2,638	-1	106	-1	16,841	20	0	0	1,267	91	0	0
Wisconsin Public Service	1,528	-32	124	0	0	0	19,495	1553	0	0	1,788	182

NA, Not Available
*Holding Company

¹Middle South Utilities now Entergy Corp.
²Wire miles

³Pole miles
⁴Cable miles

the drop in prices of the fuel in recent years. For instance, as reported by Andersen-Cambridge, the average delivered price of natural gas was \$2.31/Mcf in 1987, which was down 11¢ from 1986.

In addition, using their figures, Andersen and Cambridge calculated that gas cost 77.6¢ less per million Btu than oil. (But of course this changed as oil prices dropped further in 1988.)

Another reason could be the relatively low capital cost to a utility of adding gas-fired capacity.

No matter what the reasons, the largest gas users reported by the Top 100 were:

- Texas Utilities—at almost 361 MMCF burned in 1988.
- Public Service of Colorado—using more than 336 MMCF.
- Houston Industries—consuming about 271 MMCF.
- Central & South West—at approximately 196 MMCF.
- Middle South Utilities—decreased its usage this year, but still consumed almost 183 MMCF of natural gas in the year 1988.

T/D, a key element

Transmission and distribution have become a much more important element in the electric power supply formula in this country as shortages in one area are met with imported power from others, including Canada. And even the Europeans are beginning to pay a lot of attention to T and D as the year for the merging of the European Community approaches.

The European Community Commission recently adopted proposals to open up their wholesale markets in electricity and natural gas. The measures, noted the *Wall Street Journal*, would establish wide access to energy networks in the EC countries.

Does this sound familiar? The *Journal* quoted Antonio Cardoso e Cunha, EC commissioner for energy affairs, as saying the ultimate goal was to allow "a consumer in one country to buy electricity from any other country."

The North American Electric Reliability Council (NERC), however, noted that bulk transmission systems in most regions were expected to have adequate margins.

Yet in its 1989 Summer Assessment, NERC also noted that portions of the bulk systems in some some regions might be loaded to their safe operating limits much of the time by intersystem transfers superimposed on the normal loading.

In particular, the organization warned of "marginally adequate" inter-regional transfer capability in the Midwest and extremely low incremental transfer capability in eastern regions because of continuing high levels of west-to-east transfers.

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

ComEd faces refund

\$200 M disallowance could cut EPS by \$1.40

CHICAGO—Commonwealth Edison Co. faces a second regulatory disallowance of about \$200 million on its Byron 1 nuclear plant that would cut earnings per share by \$1.40, compared to \$3.01 EPS for 1988, the company said.

On July 9, the Illinois Commerce Commission voted 5-0 to direct a hearing examiner to draft a compromise order which would find \$291 million of Byron 1 costs unreasonable due to a 16-month construction delay. The commission could vote on the order on the order at their Aug. 23 meeting.

The total disallowance would be higher than two separate audits previously sanctioned by the ICC.

ComEd's Robert Berdelle explained that since the utility already wrote off a \$101.5-million disallowance in 1985, this order, if approved, would mean a

\$186.9-million refund, about \$200 million with interest.

The Illinois Cook County Circuit Court may determine how and when the refund will be made, although ComEd could be required to pay it all in September, said Beth Bosch of the ICC.

The refund would mean a one-time refund of \$35 to the average residential customer, Berdelle said.

ComEd is "shocked and very disappointed to hear this news," Berdelle said. "We believe a disallowance of this magnitude is excessive and unfair," he added, citing that Byron 1 has saved consumers \$600 million with lower fuel costs in four years of operation.

If the commission approves the order, ComEd said it would seek a rehearing from the ICC or a court appeal.

The ICC-proposed refund is considerably less than the \$1.8-billion refund and \$495-million rate reduction sought by the Citizens Utility Board, a consumer's group. CUB claimed ComEd overcharged customers as a result of the ICC's 1985 \$495-million rate increase for the first of two Byron nuclear units.

The Illinois Supreme Court had given the Illinois Commerce Commission an Aug. 1 deadline to decide on the refund and rate reduction. With one commissioner abstaining, the ICC voted 3-3, so no decision was made.

CUB said it would ask the Illinois Cook County Circuit Court to determine how much the utility owes. Under

CUB's proposal, ComEd would be required to pay about \$250 per average residential customer, a CUB spokesperson said.

ComEd had implemented a cost-cutting program after a decision earlier this year allowed recovery of about one third of the company's \$7.1-billion investment in three other nuclear units (EL&P, Feb., p.1). Subsequent decisions on those plants could mean additional disallowances.

New Orleans breaks talks on NOPSI purchase

NEW ORLEANS—Hatchets are not as easily buried as thrown.

The city of New Orleans broke off talks on July 31 with New Orleans Public Service Inc., just 19 days after a preliminary agreement to buy that utility's electric and gas assets.

Specific details of that agreement were not to be disclosed until July 25 when negotiators were to present details for public review. Apparently the details were the problem.

Language obstacle

"Many areas of common agreement were established," NOPSI said in a statement, "but we were unable to reach agreement on the language implementing the conceptual proposal."

LATE NEWS

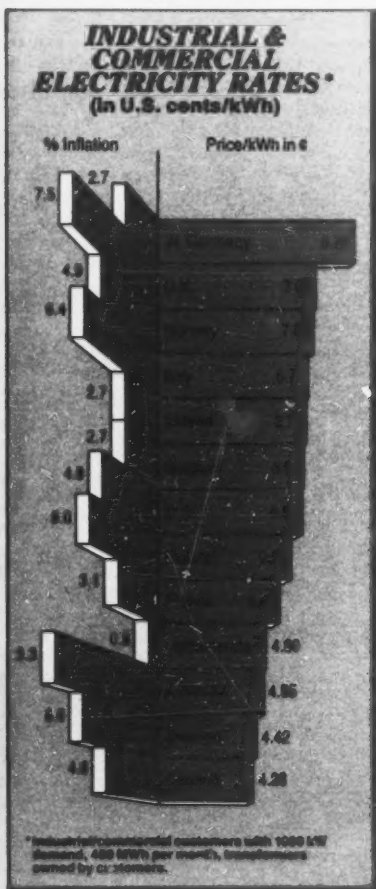
Bids are out for 1,100 MW of new generating capacity for Virginia Power. Boston Edison Co., seeking 200 MW, received bids for more than 2,800 MW.

Colorado-Ute Electric Association had the involuntary bankruptcy petition against it dismissed by a U.S. bankruptcy court. Buyout talks continue.

Public Service Co. of New Hampshire's financial status is a factor in Seabrook full-power licensing, the Atomic Safety and Licensing Appeal Board found. But because 36.5-percent owner PSNH may be close to settling its reorganization plan under bankruptcy protection, the finding may not affect the NRC decision. Plant operator New Hampshire Yankee asked the NRC to postpone a fourth onsite emergency response exercise until after full power to avoid the "endless loop of litigation."

Tucson Electric Power dividend dropped 59 percent from 97.5 cents due to rate uncertainty.

WPPSS delayed plans for a bond sale after Chemical Bank, a trustee from the previous \$2.25-billion default, said old bondholders should get part of the proceeds from any new financings.



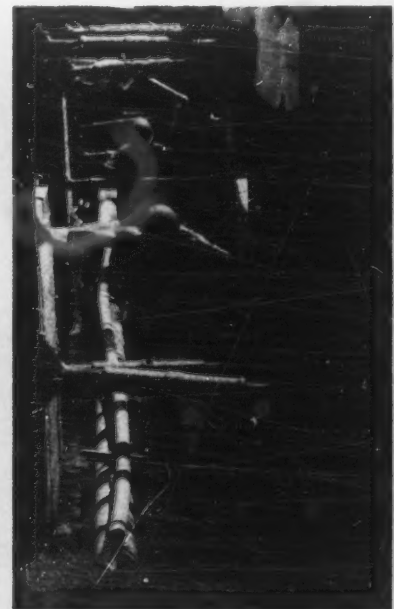
WEPCo vs. EPA: apply new source to renovations?

MILWAUKEE—Wisconsin Electric Power Co. says the Environmental Protection Agency is changing its rules. The EPA maintains that WEPCo's adding capacity and should be bound to New Source Performance Standards.

Both sides have filed briefs and will give oral arguments this fall in what could be the industry's test case for plant renovations/life extensions.

If Chicago's 7th U.S. Court of Appeals upholds EPA's decision that tightens Clean Air Act regulations, utilities could wind up spending twice as much for renovations of coal-fired power plants by adding scrubbers.

WEPCo's Port Washington Power Plant renovation involves \$71 million of work on turbine-generators, boilers, mechanical and electrical auxiliaries, and common plant-support facilities. Continued on page 8



Cables go underground before under Sound

Workers support conduit during a pour for the Long Island underground portion of New York Power Authority's 600-MW, \$345-million Long Island Sound cable project. At right, all four conduits are visible. In that photo, the 8-in. conduit, lower left, will hold the 345-kV single-circuit cable. Above that is a 5-in. conduit for return of the dielectric fluid. At lower right are two 3-in. lines for fiber optics. Begun in May, the project is expected to start under the Sound in October and be completed by the spring of 1991. The 25.6-mile line will link Long Island Lighting Co. to Consolidated Edison Co.

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VA Power reduces staff

Virginia Power recently eliminated 820 positions, a move that will actually affect about 400 to 600 employees due to vacancies. The company also plans to eliminate the use of several hundred contract workers. Virginia Power said the cuts were necessary to partially offset the costs of providing new facilities to meet increased demand for power not covered by current rates. The reduction will save about \$25 million annually and will help to maintain competitive rates, according to the utility. Virginia Power said it has already cut costs this year by reducing operations expenses 3.6 percent, and cutting capital expenses by 7.4 percent.

Limerick 2 gets OK to start low-power testing

The Nuclear Regulatory Commission issued Philadelphia Electric Co. a license to begin low-power testing at Unit 2 of its Limerick generating station. The license lets Limerick 2 operate at power levels of up to 5 percent of full power.

Breaker failure starts fire at hydro station

Metropolitan Edison Co. reported that a breaker failure at the Cly Substation resulted in a fire at its York Haven Hydroelectric Generating Station in July, and interrupted electrical service to about 4700 customers. No injuries were reported, but damage to the equipment and switchgear room caused Met-Ed to shut down the plant.

EUA acquires Newport Electric from NECO

Eastern Utilities Associates said it has reached an agreement with NECO Enterprises Inc. to purchase Newport Electric Corp. in exchange for EUA common shares. The companies also entered into a power purchase agreement to be implemented over the next five years. EUA said its subsidiary, Montaup Electric, has been supplying the bulk of Newport Electric's power at wholesale for many years.

PSNH requests future power supply proposals

PSNH requests future power supply proposals

Public Service of New Hampshire Senior Vice President Ralph S. Johnson said PSNH is seeking proposals for 50 MW of external generation to help meet its future electrical demand. Proposals will be considered from small and independent power producers, cogenerators and other electric utilities, according to the utility. PSNH said the projects should be operational by 1994.

ID Power leaves Maine

Idaho Power Co. announced the completion of its corporate migration from Maine, which has been the utility's state of incorporation since 1915. Idaho Power, headquartered in Boise, ID, said it migrated because it wanted to become an Idaho company in every respect and needed greater flexibility in its business operations.

Companies to market Duke Power Financial Management System

Andersen Consulting said it has signed a three-year agreement with Mill-Power Technologies, an affiliate of Duke Power Co., to jointly market the utility's Financial Management System (FMS). The system allows line managers to use their own work identification terms to plan, budget, charge, track, and report financial information. FMS then automatically translates the identification terms into corresponding account numbers. According to Andersen, the systems will be marketed in two forms: the FMS Design Guide, a "blueprint" that enables a utility to develop its own financial information system; and FMS application software, a DB2/COBOL language version of the system.

NRC staff withdraws fine against HL&P

NRC staff withdraws fine against HL&P

The Nuclear Regulatory Commission staff said it has withdrawn a \$50,000 fine proposed in March against Houston Lighting & Power Co. The fine was proposed for failure to install vortex suppressors in the containment of emergency sumps at Unit 1 of the South Texas Project. The staff reviewed HL&P's response to the action and said it should give more consideration to the utility's overall construction and quality assurance record. According to James Lieberman, director of the NRC Office of Enforcement, failure to install the equipment "did not result in a condition of high actual safety significance, with respect to the operability of plant equipment."

Stone & Webster offers on-site utility seminars

Stone & Webster Management Consultants Inc. said it is offering on-site, utility finance seminars to non-financial utility managers. The two-day seminar covers accounting principles, cash flow, utility finance, and cost of capital, and includes accounting and financial workshops. According to the company, its seminar would be very useful to managers in rates and strategic planning, materials and services,

power supply and MIS. For more information contact: Bob Jackson (212) 290-7129 or Ray Saleeby (212) 290-7018.

Westinghouse-ABB, Control Data team up

The Energy Management Division of Control Data Corp. announced that it has entered into a teaming agreement with Westinghouse-ABB Power T&D Co. Under the agreement, the companies will integrate their distribution management products and field equipment to manage a utility's distribution requirements on a systematic basis. "We welcome this opportunity to combine resources with one of the world's leading corporations to help the electric utility industry provide services efficiently and economically," stated Richard M. Rickenbach, vice president and general manager of the Energy Management Division.

Neale named president and COO at NIPSCO

Gary L. Neale was appointed president and chief operating officer at Northern Indiana Public Service Co., and executive vice president of NIPSCO Industries Inc. He replaces both Edmund A. Schroer as president, and the retiring Jack W. Stine as chief operating officer and executive vice president. Schroer will continue as chairman, president and CEO of NIPSCO Industries.

KPL head to retire

KPL Gas Service Chairman, CEO and President David Black plans to retire this month at the age of 61. Black said he has appointed a search committee to select his successor and that the search is well underway. According to KPL, an executive committee will monitor the operation of the company during the transition period. "I think a new chief executive officer should have the opportunity for a fresh start on his own terms without a long overlapping period of transition," stated Black.

UtiliCorp picks Theisen as division president

UtiliCorp United has appointed K.P. "Mike" Theisen as president of its Northern Minnesota Utilities division. Theisen was formerly general manager, support services for UtiliCorp's Peoples Natural Gas division. He replaces Fred K. Little who will serve as president of the company's Missouri Public Service division.

ABMA officers chosen

Frank E. Lammers, president of Peabody Engineering Corp., was named president of the American Boiler Manufacturers Association at its annual meeting. Riley Consolidated Corp. President and CEO H.

Kerner Smith was appointed vice president of ABMA.

NCA reelects chairman

The National Coal Association recently reelected W. Carter Grinstead Jr. as chairman and Wayne T. Ewing as vice chairman at its annual meeting. Grinstead is currently general manager, U.S. Coal Operations for Exxon Coal and Minerals Co., and Ewing is president of Peabody Development Co.

Jacobsen to serve as president of NWPPA

Sharon Jacobsen has been selected as president of the Northwest Public Power Association for 1989-90. She is a director at Missoula Electric Cooperative. NWPPA serves 156 publicly owned utilities in 10 western states and three Canadian provinces.

BG&E recognized as top communicator

The Public Utility Communications Association presented Baltimore Gas & Electric Co. with its Award of Excellence, at the International Better Communicators Competition held recently in Edmonton, Canada. BG&E received 12 awards in 25 categories for utilities with over 700,000 customers and was ranked first in its category, according to the utility.

EPRI presents four tech transfer awards

The Electric Power Research Institute's Electrical Systems Division Committee has named four engineers to receive its Technology Transfer Recognition Award for 1989. The recipients are: Kay Clinard, Carolina Power & Light Co.; Robert Nosse, Ohio Edison Co.; Howard Petrie, Public Service Electric & Gas Co.; and John Postforroosh, Puget Sound Power & Light Co. The engineers were recognized for their outstanding contribution to the use of EPRI-developed technology, according to the institute.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:
Baltimore Gas and Electric A \$75,000 fine for two alleged violations of NRC requirements at Units 1 and 2 of the Calvert Cliffs nuclear plant.
Louisiana Power & Light A \$50,000 fine for an apparent violation of NRC requirements during the operation of Unit 3 of the Waterford Steam Electric Station.
Pacific Gas and Electric A \$75,000 fine for alleged violations of NRC requirements involving engineering and plant procedures and timely resolution of identified problems at the Diablo Canyon nuclear power plant.

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EEI annual report '88

Economy, weather boost utilities; net income dips

WASHINGTON—Sustained economic growth, unseasonable weather and a lower price for electricity in 1988 pushed investor-owned electric utilities' sales up by 4.6 percent over 1987 to nearly 2-billion MWh, said EEI's annual industry report.

In addition, 1989 first-quarter sales were up a solid 2.1 percent on top of last year's growth of 6.8 percent for the period. (See related story, p. 12.)

Revenues in 1988 totalled \$135.3 billion, up 4.6 percent from \$129.4 billion in 1987, according to the Edison Elec-

tric Institute.

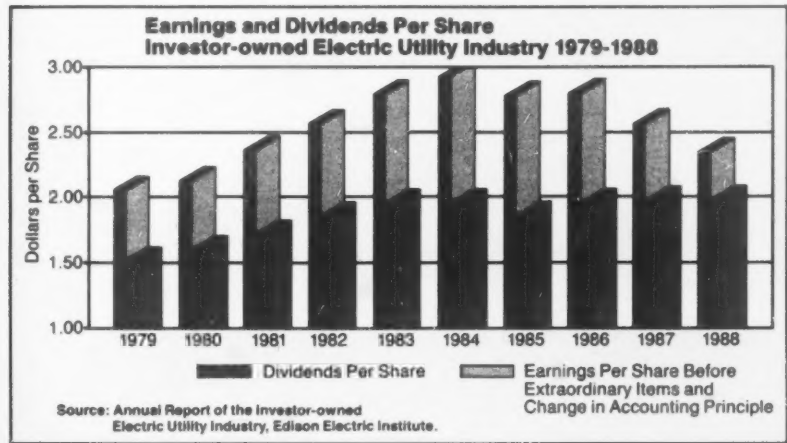
The 1988 "Annual Report of the Investor-owned Electric Utility Industry" also said:

- Two-thirds of the 75 largest investor-owned utilities exceeded their peak-demand estimates for 1990.
- Average number of customers grew by 1.9 percent, or 1.5 million.
- Shareholder earnings dropped by 10 percent, mainly from substantial write-offs related to plant disallowances or-

dered by state regulators and a lower level of accounting accruals for the Allowance For Funds Used During Construction.

Earnings per share down 80¢

These write-offs reduced the industry's financial 1988 earnings per share by 80 cents. Although net income was down, the quality of earnings and internal generation of cash improved. (See Continued on page 4)



Nine Mile Two owners agree for the interim

SYRACUSE, NY—An interim agreement among the five owners of Nine Mile Two nuclear power plant will increase involvement by owners and may lead to formation of a separate operating company.

The 18-month agreement establishes a legal relationship between Niagara Mohawk Power Corp. as operator and 41-percent owner and other owners: New York State Electric & Gas Co. and Long Island Lighting Co. (each owning 18 percent); Rochester Gas & Electric Corp. (14 percent); and Central Hudson Gas & Electric Corp. (9 percent).

"We intend to study and establish the best operational entity to manage the plant over its 40-year life," said William J. Donlon, NM's chairman and chief executive officer.

Sets a formal arrangement

"This formalizes what has been, to a degree, an informal arrangement for co-owner oversight and involvement in the

plant's operation," Donlon said. "The changing nature of the regulatory and operational environment over the past 15 years merits increased involvement," he added.

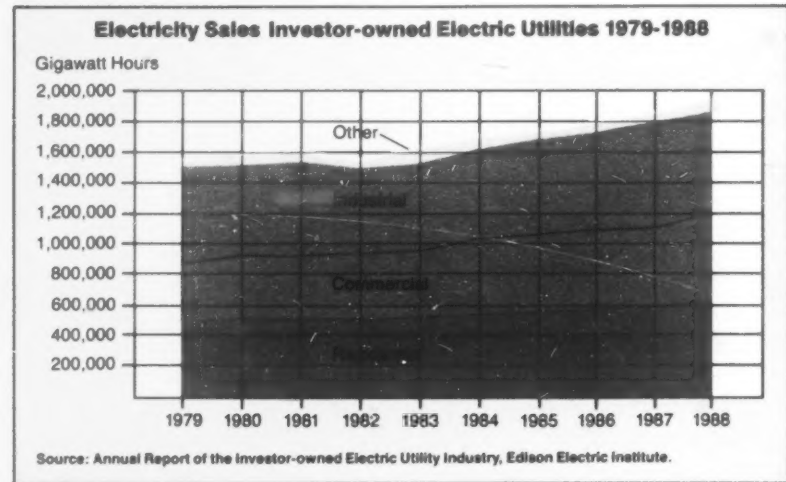
Activities associated with the plant have been conducted under a co-tenant operating agreement approved in 1975.

The new agreement details roles within the existing management committee—made up of representatives from each of the owners—and a number of subcommittees to provide oversight of planning, budgeting and operational decisions.

NM holds dividend decision

In separate business, NM postponed a decision about paying a 30-cent common dividend per share. To make the Sept. 30 payment, the board would have to decide by the end of August.

NM first-quarter net income dropped 37 percent due to troubles with Nine Mile 1, out of service since Dec. 1987.



SMUD/Quadrex work on Rancho Seco plant agreement

SACRAMENTO, CA—Sacramento Municipal Utility District and Quadrex Corp. are continuing discussions about the details of a \$231-million bid for the Rancho Seco nuclear plant.

The groups missed an Aug. 11 filing deadline to put the matter on the November ballot. A special election would be held to approve any sale of assets or operating agreement for the plant.

Quadrex seems the top prospect after the 10 days of bidding for the closed Rancho Seco plant, according to criteria laid out by SMUD. Bidding was June 21-30 (EL&P, Aug., p. 3).

The Quadrex/Stone and Webster Engineering Corp. proposal was the only one received that would keep the plant nuclear-powered, and assume ownership, license and decommissioning, SMUD said. The plant was closed by SMUD following a non-binding June

referendum and is now undergoing preparations for decommissioning.

September would be the earliest the two sides would arrive at a memorandum of understanding, estimated SMUD spokesperson Jeff Marx. A progress report for the SMUD board was due Aug. 17.

Fuel is due to be removed from the plant by mid-October.

Summer storms challenge utilities; hydro looks better

BARRINGTON, IL—Summer stormed to a quick start in challenging U.S. utilities, according to several reports.

On the positive side, spring weather patterns brought above-normal rains to some regions, restoring reservoir capacities and hydroelectric generation. (See related story, p. 25.)

A June 16 storm interrupted service to as many as 107,000 South Carolina Electric and Gas customers. Lightning and high winds took out 745 poles, 350 transformers and 48 miles of line. SCE&G had to restring 2000 service drops to homes and rebuild 300 miles of distribution line. Crews from area utilities helped.

In addition, Potomac Electric Power Co. reported nearly \$5 million in damage from a June 14 storm. Duke Power Co. suffered \$10-million worth of damage during the first weekend in May, compared to \$2.5 million for a usual year.

Rains restore reservoirs

After a year of record drought in many areas, abundant spring rains restored hydro capacity to normal or above-normal levels, according to the Energy Information Administration Electric Power Monthly. Hydroelectric plants produced 24,075 GWh during April, 4971 GWh more than April 1988.

PS Colorado tries dry sodium injection

Public Service Co. of Colorado installed the first commercial dry sodium injection system at Cherokee Generating Station's 350-MW Unit 4 to reduce SO₂ emissions by 60-80 percent. The \$1.5-million system (inset), undergoing testing early in July, consists of two parts like this one. The sodium substance is drawn down in pipes from above through the blowers on the left, into the pulverizer on the right, blown into the flue duct then collected in the new \$30-million fabric filter dust collector. The plant's new bag-house, shown on a foggy day, is the first of six Denver-area installations for the dry-sodium system at a total cost of \$11 million. Each will use about 8350 tons of sodium substance a year with an annual operating cost of about \$1.17 million. Learn about PS Colorado's bid for Colorado-Ute, page 7, August issue of EL&P.



Pinnacle challenges temporary order limiting dividend

PHOENIX, AZ—Pinnacle West Capital Corp., parent of Arizona Public Service, twice challenged state regulators' temporary limit on what money it can draw from the utility.

August 9, PWCC filed a suit with a state court saying state regulators acted beyond their power by limiting cash flow between the utility and parent.

And in a hearing a day later, state regulators agreed to hear the corporations' objections to the temporary order.

Then on Aug. 15, the commission agreed to lift the order. PWCC agreed that it would not make a large cash transfer. The order prohibited above-normal APS payments to PWCC and limited the Sept. 1 dividend payment to the same as the second quarter's \$52.7 million. Regulators feared huge cash transfers for PWCC's troubled thrift subsidiary, MeraBank.

Beaty to head EL&P T&D editorial program

We are extremely pleased to announce that H. Wayne Beaty has joined our staff as Senior Editor—Transmission/Distribution. In this new spot he will be responsible for EL&P's coverage of transmission and distribution activities, bringing you the most up-to-date reports of current T&D developments and timely, important engineering articles.

Many of our readers are well aware of Wayne's experience and qualifications, and can share our enthusiasm for his joining our staff. As a number of our readers are aware, we've been looking for about a year for just the right person to head up an intensified and expanded transmission and distribution program. We believe Wayne exemplifies that special combination of talent, experience and dedication we were searching for.

For the past few years, Wayne has been doing freelance writing and consulting. His experience dates back to the late 1950s when he worked for Houston Lighting & Power Company while earning his Electrical Engineering degree from the University of Houston. He later joined Central & Southwest Corp.'s subsidiary, West Texas Utilities, where he served in several capacities before becoming Chief Distribution Engineer.

Subsequently, Wayne was a Senior Editor at *Electrical World* magazine and then became Manager of Member Services for the Electric Power Research Institute, later also serving as Deputy Director of EPRI's Washington office.

He is Editor of the *Standard Handbook for Electrical Engineers* and the *Electrical Engineering Materials Reference Handbook*. As a freelance writer, he has contributed engineering articles to numerous journals and books.

He says he's looking forward to renewing his many old acquaintances and meeting new friends in the T&D engineering field. But he's not nearly as pleased at that prospect as we are at the prospect of bringing the products of his efforts to our T&D reader audience. Welcome aboard Wayne!

Slash electricity use by 1999?

A recent proposal calls for electrical use to be cut by 25 percent in the next decade. The suggestion came in testimony given by the Municipal Electric Systems of Oklahoma during one of the Department of Energy's current rounds of hearings on formation of a national energy strategy. While the idea of reducing electricity use may appear heretical to long-time electric utility leaders, and has been heard often in anti-utility, anti-growth and environmental protection group arguments, this is a bit different.

The goal, suggested MESO, should be to improve effective use of energy, not clean up its production methods. The logic: a buck spent for pollution control reduces pollution only (which isn't bad), but a buck spent to improve the efficiency of electrical usage reduces use of valuable, limited and expensive fuel resources as well as reducing pollution (which is far better). Ergo, MECO declares, it makes doubly good sense to invest in new energy efficient lighting systems, motors and other modern equipment, appliances and devices.

MECO proposes the government push commercial electric vehicle development and use, in combination with utilities retrofitting customers' equipment and appliances. Incentives of 125 percent of investments in energy reduction programs added to rate bases, 5-yr depreciation and tax credits could make the effort attractive.

While adoption of such a program could have an impact on both resource use and environmental protection, it would represent only a temporary hiatus in the current growth trend. Once fluorescents are substituted for incandescent lamps, and more energy efficient motors and appliances are installed, demand and use will move upward again.

DOE will continue hearings into next year. The goal, by next April, is to develop a national energy strategy. We would hope the outcome will be a working document, one that can be used to guide and shape energy resource development and use, but also one that can be adapted to meet the changing conditions that are sure to emerge.

Robert A. Lincome, Editor-in-Chief

Debate continues on clean air bills

WASHINGTON—Congressional debate continued on clean air legislation in July and early August.

President Bush's proposals were introduced to the House July 28 as HR-3030. Rep. John Dingell (D-MI) and Rep. Norman Lent (R-NY) are lead sponsors. More than 140 other House members are cosponsors. Senate members were debating details but as of early August had not introduced it.

The Bush proposals call for reductions of 10-million tons of sulfur dioxide and a 2-million ton cut in nitrogen oxide emissions by the year 2001.

The Bush plan, announced June 12, also intends to cut urban air pollution and ozone, toxic air emissions, and carbon monoxide (EL&P, July, p.6).

Topics for debate include baseline levels for emissions reductions, financial commitment to clean coal projects, cost sharing, guidelines for an emissions trading program and the cuts for nonutility sulfur dioxide emitters.

Utilities would have flexibility by trading some emission requirements. The Edison Electric Institute maintains that clear-air revisions should wait until after results of the National Acid Precipitation Assessment Program are ready next year.

Public Service of Indiana Inc. would be one of the utilities most affected, said spokesperson Pam Chapman.

Continued on page 6

from page 3

EEL annual report '88...

related results, EL&P, June, p.1.)

Six nuclear plants came online last year, increasing investments in rate-base. As capital outlays decreased, especially for large lead-time projects, Construction Work In Progress fell. The common stock equity ratio remained relatively high at 43 percent at the end of 1988.

More with less capital

In addition, utilities continued to expand their use of less-capital-intensive power supply and demand options.

These included purchases from non-traditional power producers, competitive bidding and increased demand-side techniques, leading to greater energy efficiency.

These efforts improved service to customers and shareholders' value, EEL explained.

Growth continues into 1989

Continuing economic growth propelled investor-owned utilities to a

quarterly revenue increase of 3.4 percent, from \$30.6 billion to \$31.6 billion. The increase came despite mild weather. Heating degree-days dropped 6.5 percent from first-quarter 1988.

Earnings per share, however, fell 11.6 percent before extraordinary items to 61 cents from 69 cents. Write-offs and a lower level of income accruals and expense deferrals were the primary cause, EEL noted.

Fuel costs less as a percentage

First-quarter fuel and other operation and maintenance expenses rose by 1.7 percent and 2.2 percent, respectively.

Despite the small increase, fuel, as a percentage of operating revenue, was only 23.2 percent in the first quarter, the second lowest percentage since EEL began figuring quarterly financial statistics in 1977. Fossil fuel costs were lower, the amount of low-cost nuclear generation increased, and conditions for generating hydroelectric power improved.

Investor-owned Utility Highlights of 1988

	1988	1987	% Change
Financial			
Electric Operating Revenues (Millions)	\$135,279	\$129,382	4.6
Utility Plant (New) (Millions)	\$371,254	\$366,370	1.3
Construction Work in Progress (Millions)	\$40,379	\$52,286	(22.7)
Total Capitalization (Millions)	\$336,784	\$330,258	2.0
Construction Expenditures (Millions) (Including AFUDC)	\$84,702	\$87,005	(2.6)
Earnings Available for Common Stock (Millions)	\$13,710	\$15,205	(9.8)
Earnings Per Share, Common Stock	\$2.34	\$2.50	(6.0)
Dividends Per Share, Common Stock	\$1.00	\$1.07	(7.4)
Return on Common Equity	10.8%	11.9%	(9.2)
Fixed Charges Coverage (incl. AFUDC)	2.62	2.92	(10.3)
Operating			
Electric Sales (MWh)	1,988,069	1,875,509	6.0
Installed Generating Capacity (Megawatts)	558,537	562,795	(0.7)
Average Number of Electricity Customers (Thousands)	80,850	79,455	1.8

Source: Annual Report of the Investor-owned Electric Utility Industry, Edison Electric Institute.

Capital Expenditures for Construction of Electric Power Systems—Investor-owned Electric Utilities (Millions of Dollars) 1979-1988

Year	Generation	Transmission	Distribution	Other	Work in Progress	Total
1979	15,391	2,090	4,304	789	1,335	23,909
1980	18,338	2,353	4,493	987	1,334	27,505
1981	20,416	2,270	4,590	1,738	1,365	30,379
1982	25,339	2,363	4,827	1,233	1,749	35,511
1983	24,936	2,371	5,021	1,452	1,748	35,528
1984	23,999	2,280	5,590	1,335	1,642	34,846
1985	21,372	1,889	5,899	1,395	2,232	32,787
1986	18,403	1,781	7,540	1,808	1,734	31,266
1987	14,396	2,088	7,437	1,386	1,332	26,639
1988p	11,348	2,088	7,844	1,386	1,732	24,498

Source: Edison Electric Institute, "Investor-owned Electric Utility Industry," Annual Report, 1989.

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EL&P

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VOICE OF THE ELECTRIC UTILITY INDUSTRY

Clean air controversy

EEI: costs could be 30% less

Mark T. Hoske
News Editor

WASHINGTON—Allowing utilities more flexibility in meeting emissions cuts in the Bush Clear Air proposal would save the ratepayers 20-30 percent off the annual price tag estimated at \$5-7.1 billion, says EEI.

The acid rain provisions of the bill, HR-3030, would cost ratepayers \$5.5 billion a year and an additional \$1.6 billion annually after the year 2000, according to an Aug. 30 analysis by Temple, Barker and Sloane Inc. for the Edison Electric Institute.

"The electric utility industry can achieve the same emission reductions without a cap if given the needed flexibility," stated EEI Senior Vice President for Energy and Environment David Swanson.

Emissions caps

In the current form, the bill will restrict the use of coal through its proposed emission caps for each utility unit.
Continued on page 8

Global damage, solutions vary

CHICAGO—Debate on the measurement, assessment and response to global warming, acid rain and ozone is nearly as complex as the myriad of variables on their collective causes and effects on climate and health.

Whatever the effect, most energy leaders worldwide agree that the multi-faceted solution includes nuclear power.

These were the views at the opening sessions on clean air at "Safety of Nuclear Installations of the Next Generation," an Aug. 28-31 workshop sponsored by The International Atomic Energy Agency and Argonne National Laboratory. (See related story, p. 13.)

The speakers acknowledged that science tangles with both politics and international relations when it considers global warming, the effects of acid rain, and the causes of ozone depletion in the upper atmosphere and unhealthy concentrations near ground level.

Global warming has 50-year lead time

One of the difficult aspects of global warming, said Pierre R. Morel, is that 50 to 100 years will pass before the world
Continued on page 8

LATE NEWS

Fort St. Vrain decommissioning was started nine months early, said owner Public Service Co. of Colorado. The decision followed an Aug. 18 shutdown for a problem with a reactor control rod. Other tests showed hairline cracks in steam tubes. The 330-MW, high-temp., gas-cooled reactor hit record production in July. **Flexibility and adaptation** to changing technology and economic requirements must be the goal of future energy policy, the 5000 attendees at the 14th World Energy Conference in Montreal were told. See November's *EL&P* for coverage.

Hurricane Hugo's devastation of Southeastern utility systems on Sept. 21, which caused at least 15 deaths and widespread property damage, will be reported in the November issue of *EL&P*.

GE, Westinghouse advance reactor designs with \$100M

WASHINGTON—The Department of Energy granted \$50 million each to GE Nuclear Energy and Westinghouse Electric Corp. to continue development of advanced, simplified, nuclear reactor designs.

Each company will double that with support from other sources.

The contracts require that each company submit the 600-MW designs for Nuclear Regulatory Commission approval. Westinghouse plans to submit its advanced light-water design in 1994. GE said it would present its boiling-water reactor design in 1995.

Both companies will receive money from the Electric Power Research Institute, associates and investors in the projects.

The standardized designs, highlighted in *EL&P's* April '89 issue, will be certified by the NRC in advance to cut down construction times and the high-interest costs linked to delays. The new designs promise construction in five years or less, compared to 10-20 years for current designs.

Continued on page 3

ELECTRICAL OUTPUT

Increases in electrical energy output across the country were down considerably compared to those seen last year, mostly due to the milder summer weather. Yet usage, as reported by the Edison Electric Institute, still was up, since no area of the country showed a decrease or even held at the same level as last year. The graph shows the percentage increases across EEI's 10 geographical reporting areas during the 52-week period ending August 19, 1989, compared to the same period in 1988.



Large public power systems vary from APPA on transmission views

WASHINGTON—A group of 17 large public power systems is taking a separate stand of transmission issues than the American Public Power Association (APPA).

The Large Public Power Council (LPPC), formed by the 17 big municipal utilities two years ago, said in a recent policy paper that "We represent a middle ground between those who would leave questions of access to the marketplace and sole discretion of transmission owners (investor-owned utilities), or those who would impose drastic regulatory mechanisms for mandatory access [APPA]."

Further, LPPC said, "Electric utilities and qualified power producers in the bulk power wholesale market should be permitted to participate in the construction and use of new transmission facilities."

LPPC members now provide access to their transmission systems and would support increasing access as long as:

- Reliability, obligation to serve and overall interest of existing customers are preserved.
- Owners and power pools retain operational control and regional reliability councils continue assessment.
- Excess transmission capacity will be made available and new capacity should be made available to those willing to share its cost.

• Inadvertent parallel flows must be considered in any access action.

• Pricing should be negotiated by the providers and users, with dis-

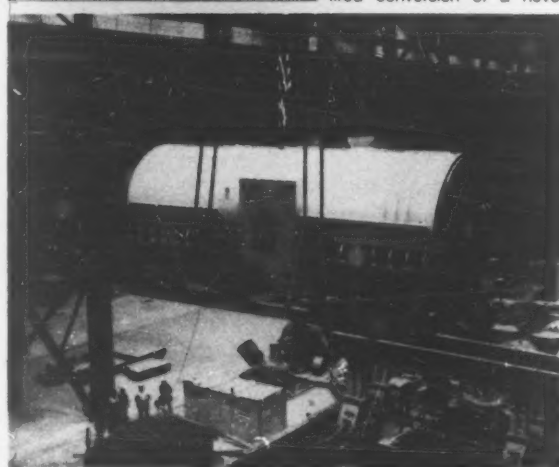
putes resolved through a mutually agreed upon binding arbitrator.

Although the 17 formed their own association, they still are among the 2,000 APPA members. They serve 40 percent of public-power customers.
Continued on page 3

Zimmer stator drops through roof



The Zimmer Plant's 400-ton generator stator is lowered through the roof Aug. 18 as the final major component. The generator stator measures 32-ft long with a 14-ft diameter. "This stator is the largest 60-cycle, 2-pole stator ever manufactured by Asea Brown Boveri of Switzerland," said John R. Jones, vice president—project management and construction of American Electric Power Service Corp. AEP is managing the conversion. Operation is expected mid-1991. Zimmer, operated by Cincinnati Gas & Electric Co., is a 1300-MW coal-fired conversion of a never-operated nuclear plant. In



addition to CG&E, other owners are AEP's Columbus Southern Power Co. and Dayton Power & Light Co. The modular assembly of the plant was aided by a Lampson Trans-Lift 1200 crane with 1200-ton capacity. "The modular approach has saved money as well as space at the site and shortened construction time," Jones said. Quality was also improved, he added. Major components were built in shops, rather than at the plant site.

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FERC revises standard for price squeeze relief

According to the American Public Power Association, the Federal Energy Regulatory Commission has revised its standard for parties seeking preliminary relief from alleged price squeeze when CWIP (construction work in progress) is included in the wholesale rate base. The commission's revised standard requires a party seeking relief to show that it is likely to be harmed in some way if CWIP is allowed. FERC will then weigh the interests of the party, the utility, and the public in its decision on the request for relief, APPA said.

House passes bill with buy American provision

The House of Representatives has passed the Energy and Water Development Appropriations Bill which contains a "buy American" provision for EHV equipment. According to the National Electrical Manufacturers Association, the provision requires federal power agencies to apply a 30-percent price differential in evaluating bids for EHV power equipment. Countries are exempt from the provision if they provide fair and open competitive opportunities for American manufacturers in their utility markets. NEMA said the provision, which must now pass through the Senate, is designed to open foreign utility markets to U.S. producers.

Missouri co-ops may offer incentive rates

NW Electric Cooperative and its eight distribution cooperatives have hired Burns & McDonnell to redesign their rates

for industrial loads, according to the consulting firm. "We need to be able to offer industries attractive rate options within each of our eight service areas if we are to overcome the agricultural losses of recent years," stated NW Electric Manager Curt Funston. Burns & McDonnell said it has recommended that all the cooperatives in Northwest Missouri offer economic development rates and interruptible rates. The cooperatives are looking at other economic incentives to combine with the special rates, and a complete incentive package is expected in January 1990, according to the firm.

CEOs say federal deficit is a "serious" problem

A Conference Board survey of more than 400 U.S. chief executive officers found that 87 percent view the federal budget deficit as a "serious" problem. At least 80 percent called for cutbacks in farm supports, foreign aid and national defense. Over one-third of the CEOs oppose any cuts to Social Security, Medicare and benefits for veterans, the unemployed and children, and about half favor only "small" cuts to these areas. Eighty percent of those surveyed call for welfare cuts, while one-third suggest large reductions. According to the survey, almost 90 percent of the CEOs proposed higher excise taxes on tobacco and alcohol as sources of new revenue.

Court rules on SEC holding company order

A U.S. Court of Appeals ruling involving the Public Utility Holding Company Act of 1935, may lead to further proceed-

ings by the Securities and Exchange Commission, according to WPL Holdings Inc. Wisconsin's Environmental Decade petitioned for a review of an SEC order which allowed WPL Holdings to acquire all of Wisconsin Power and Light Co.'s stock and exempt WPL from all but the acquisition review process of the Act. The Court rejected two of the Environmental Decade's arguments, but said more evidence was required to settle the question of whether or not the reorganization was "tending toward the economical and efficient development of an integrated public utility system" as required by the Act. WPL Holdings said that, while the public utility system issue is being settled, it will continue to operate as it has since the stock was acquired in March 1988.

DOE, Westinghouse agree on reactor issues

The Department of Energy said it has reached an agreement with Westinghouse Electric Corp. on a joint approach to resolving questions and setting a schedule for restarting production reactors at the Savannah River Site in South Carolina. The Westinghouse Savannah River Co. operates the site under contract to DOE. The site's three production reactors, which produce a radioactive form of hydrogen called tritium, have been shut down for over a year, according to DOE.

Oyster Creek restarts

GPU Service Corp. reported that its Oyster Creek station restarted after the system's mobile main output transformer was tied in. One of the

plant's two main transformers failed in June, and the second failed in July, according to the company. The new transformer will allow the plant to operate at about 2/3 of its normal maximum capacity. GPU said Jersey Central Power & Light Co., owner of the transformers, is evaluating the problem.

BE's Pilgrim inches up

Boston Edison Co. recently reported that its Pilgrim Nuclear Power Station has reached 75-percent reactor power.

Idaho Power Chairman resigns due to health; Marshall is new head

Idaho Power Co. Executive Vice President Joseph W. Marshall was named to succeed Robert J. O'Connor as chairman and chief executive officer of the company, after O'Connor resigned recently due to health problems. O'Connor, 61, said his recuperation from surgery in June would be an extended one, and that his retirement would assist in his recovery. During his 37-year career at Idaho Power, O'Connor became chief executive officer in 1985 and has served as chairman since 1987. Marshall, 51, joined the utility in 1969 as a distribution engineer.

Arnold picked to head Louisiana Energy

Louisiana Energy Services has chosen W. Howard Arnold as president. Howard most recently served as vice president of engineering and development at a subsidiary of Westinghouse Electric Corp. Louisiana Energy is a joint effort of Duke Power Co., Northern States Power Co., Louisiana Power & Light Co., Fluor Daniel Inc., and Urenco. The company said it plans to begin construction of a nuclear fuel enrichment facility in 1992.

Brown to act as interim president at KPL Gas

KPL Gas Service has announced that William E. Brown will serve as president until a successor to David S. Black is chosen. Black is currently chairman and chief executive officer of the company. Brown was previously executive vice president and chief operating officer at KPL Gas.

Management team for 1990s named at AEP

American Electric Power Service Corp. appointed five new operating company presidents and a new executive vice president-operations. Senior managers who will serve as president and chief operating officer include: Joseph H. Viperman, Appalachian Power Co.; Thomas R. McCaffrey, Columbus Southern Power Co.; James M. Allison, Wheeling

Power Co.; Richard C. Menge, Indiana Michigan Power Co.; and Coulter R. Boyle III, Kentucky Power Co. William J. Lohta was selected as executive vice president-operations of AEP Service Corp.

PP&L exec retires; utility reorganizes

Merlin F. Hertzog, executive vice president - corporate services at Pennsylvania Power & Light Co., retired September 1, ending a 30-year career with the utility. Hertzog took over his corporate services position and became a PP&L Board member in 1984.

According to PP&L Chairman, President and CEO Robert K. Campbell, a number of organizational changes also went into effect on September 1. William F. Hecht was named senior vice president-system power & engineering, and Robert S. Gombos will serve as vice president-human resource & development.



Merlin Hertzog



William Hecht



Robert Gombos

Areas effected by the realignment include: the Public Affairs Department and the Federal Policy function; the Office of General Counsel and the Procurement & Computer Services Department; the Human Resource & Development Department; the System Power & Engineering Department; and the Division Operations and Nuclear departments.

Utilities fined by NRC

The Nuclear Regulatory Commission recently proposed the following fines:

Boston Edison Co.
A \$25,000 fine for alleged violations of its own procedures and NRC requirements during a test at the Pilgrim nuclear power plant.

Cleveland Electric Illuminating Co.
A \$37,500 fine for failing to correct previously identified electrical safety violations at the Perry nuclear power plant.

Illinois Power Co.
A \$75,000 fine for two violations of NRC electrical safety requirements at the Clinton nuclear plant.

Philadelphia Electric Co.
A \$75,000 fine for alleged violations of NRC emergency preparedness requirements at Limerick Units 1 and 2.

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ComEd may appeal \$195M refund

CHICAGO—Commonwealth Edison Co. has two options for appeal of a second regulatory disallowance of \$195 million on its Byron 1 nuclear plant as ordered by state regulators.

If a request to the Illinois Commerce Commission for a rehearing fails, then the utility could appeal to the appellate or state supreme court. A decision had not been made on either of those, said CECO's John Hogan, Sept. 12, although one or both is reported to be likely.

Court dates are scheduled for Oct. 5 and 23 to determine how the disallowed investment would be refunded to cus-

tomers. The refund amounts to \$35 for each average residential customer. In addition, interest payable on the \$195 million since 1985 could be 5-9 percent, Hogan said.

If the ICC's decision stands and a refund is ordered, it would cut CECO earnings by \$1.40 per share, Hogan indicated, with a write off likely in 1990. EPS in 1988 were \$3.01.

This decision "could set a bad precedent that we hope the commission doesn't follow," Hogan said. Three other recently completed CECO nuclear plants could be subjected to similar treatment.

WPL asks FERC for customer wheeling

MADISON, WI—Wisconsin Power & Light Co. asked FERC Sept. 12 to allow wholesale customers to purchase their power from suppliers other than WP&L and wheel those purchases via WP&L existing transmission facilities.

"As competition in the electric utility industry continues to unfold, we think it is important to give our wholesale customers a choice in whom they buy their power from," explained Erroll Davis, WP&L's president and CEO.

Tariff requested

The tariff fee requested is \$1.66/kilowatt-month, plus 1 mil/kWh transferred to cover losses, explained Daniel Gomez-Ibanez, WP&L director of wholesale services.

The action was in response to customer requests, although Gomez-Ibanez said he didn't know if any customer would use it anytime soon, if approved.

State regulators recently ordered Wisconsin investor-owned utilities to submit a plan for wheeling, but that has been challenged in court.

It's not that WP&L would allow wheeling, but the utilities that challenged the order believe that the commission overstepped its bounds of power.

Willing to compete

"What we're saying in filing the tariff is not only that we want to listen to customers but that we're willing to compete for wholesale customers anywhere and willing to open our marketplace that our territory represents to similar competition," Gomez-Ibanez said.

Erroll added that "WP&L believes that the key to remaining competitive is to provide the best and lowest cost service in its marketplace instead of depending on artificial regulatory barriers to keep competing suppliers out."

Vault fire causes hotel evacuation

CHICAGO—A failed network protector on one of four transformers in a vault near the Drake Hotel caused more than just a little smoke near the entrance to the hotel on Monday, Aug. 28. The electrical cables overheated releasing smoke through the sidewalk grating into the street near the hotel entrance. The Chicago Fire Department ordered evacuation of the hotel for about two hours until the source of the smoke could be determined.

"Our biggest problem," says Michael Kelly, Communications Service Department for Commonwealth Edison, "was the overzealousness of local media coverage. One would think that the hotel

had burned up. We worked closely with the hotel management to assure their customers that there was no real danger."

The four transformers in the vault have been replaced and were among 726 remaining in the company's \$135 million program to replace all 2444 of its transformers containing polychlorinated biphenyl (PCB) insulating fluid. The program, begun in 1984, is expected to be completed in 1991, two years before the U.S. Environmental Protection Agency deadline of October 1, 1993. Kelly said only trace amounts of PCB were found on the sidewalk adjacent to the transformer vault.

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Reactor designs...

If a utility should order one of these new reactors within a year or two, it could be under construction by the late '90s. Both designs use gravity and natural forces for emergency cooling, avoiding more complex safety systems.

DOE requested proposals in January, with responses by May. GE and Westinghouse were the only companies granted money for this particular program, said Dan Butler of DOE.

GE's Simplified BWR

GE's SBWR design effort began in the early 1980's. In 1985, the company teamed with Bechtel North American Power Corp. and the Massachusetts Institute of Technology to perform the conceptual design for, and with major support from EPRI. In 1986, DOE selected the GE team to conduct several test- and design-development programs beyond the EPRI work.

Tests last year confirmed that pumps and operator action are not needed to maintain reactor safety during a severe

loss-of-coolant accident, GE said.

Other partners in the project include Southern Company Services Inc., Burns and Roe Co., Foster Wheeler Energy Applications Inc., University of California at Berkeley, Hitachi and Toshiba of Japan, Ansaldo of Italy, and KEMA/NUCON of The Netherlands.

Westinghouse AP600

Westinghouse began developing the simplified LWR AP600 in 1984. It will consist of factory-built modules that can be assembled at the site.

Companies involved in the Westinghouse project are: Avondale Industries Inc., Bechtel North American Power, Burns and Roe, CBI Services Inc., and MK-Ferguson Co.

"The award represents a major contribution to a joint government-industry program aimed at reviving the nuclear power option," said Richard J. Slember, vice president and general manager of Westinghouse's Energy Systems Business Unit.

Ratings in the '80s
Percent Upgrades/Downgrades

	D&P	Moody's	S&P
	Down	Down	Down
1980	78%	37%	84%
1981	50	56	76
1982	63	61	68
1983	76	56	64
1984	63	42	26
1985	48	41	51
1986	31	47	45
1987	56	64	68
1988	30	60	50

(Source: Duff & Phelps Credit Rating Co. Excludes telephone utilities.)

Agencies vary widely on rating actions

CHICAGO—Utility management, planning, regulation and financing in the '80s has been challenging enough to provoke profound differences in actions by major ratings agencies.

Although analysts make it their business to keep on top of risky actions, their views vary—the three agencies differed by as much as 20 percent in upgrades and downgrades for 1988.

William A. Abrams, vice chairman, Credit Rating Committee at Duff & Phelps Credit Rating Co., recently listed some of the major risks for electric utilities. They are competition, regulation, nuclear plant operating performance, diversification, mergers, reduced cash, lower earned returns, off-balance-sheet obligations and construction spending resurgence.

New capacity wanted; bids generate interest

BARRINGTON, IL—Virginia Power Co. requested competitive bids for 1100-MW of new generating capacity Aug. 15. Separately, Boston Edison Co. received 48 bids for more than 2800 MW after requesting 200 MW in bids (EL&P "Late News," Sept., p. 1).

For Virginia Power, that brings the total to about 5000 MW of capacity the company will add to its system between now and 1997.

Evaluating proposals

BE's bids went out in April for the power to be online by 1994. Over the next three months BE officials will evaluate and rank the proposals based on criteria including price, site availability, fuel source and the likelihood of completion. Winning bids will be announced in November.

Virginia Power requested that cogenerators, small power producers, independent power producers and other utilities submit competitive bids for capacity to come on line 1995-7.

This VPP solicitation is the nation's second largest for competitively bid generation, after its March 1988 call for 1750 MW, the company said.

Development doubles, jointly

In a related development, Old Dominion Electric Cooperative (ODEC) and Virginia Power agreed to jointly develop a 786-MW coal-fired generating facility as equal partners, at Clover, VA.

The companies asked Virginia regulators' permission on Aug. 15. The two

units are due in service by December of 1993 and 1994. Total cost is estimated at \$960 million.

ODEC had previously asked regulators to develop a single 393-MW unit.

Iowa power purchases

Terra Comfort Corp., an independent power producer owned by Iowa Southern Inc., agreed to sell 118 MW of power to Iowa Electric Light and Power Co. for 21 years at an undisclosed fixed price for peaking capacity.

In addition, Iowa Southern Utilities Co., also owned by parent Iowa Southern Inc., will sell Iowa Electric up to 118 MW of energy for 16 years at the incremental cost of fuel plus 10 percent, from existing ISU baseload coal-fired plants.

Both contracts start Jan. 1, 1990. Because of transmission limits, the amount of transaction will not exceed 118 MW.

IE Industries Inc. owns Iowa Electric.

North Carolina cogeneration

In other news, General Electric Corp. signed a \$10-million contract with Cogentrix Inc. for two 55-MW steam turbines-generators for a cogeneration plant to be built in Rocky Mount, NC.

Duke Engineering & Services Inc. will provide engineering services for the facility. It will produce about 150,000 lbs/hour of steam for nearby industries and supply about 110 MW of electricity for North Carolina Power Co. starting in 1991.

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Transmission views...

LPPC was formed in mid-1987 to focus on issues specifically key to large public-power systems.

APPA downplays differences

LPPC and APPA transmission views agree on two major points said Alan H. Richardson, APPA assistant executive director, in the Aug. 28 *Public Power Weekly*.

Both groups agree that an impartial arbiter is needed to resolve disputes over transmission access.

"APPA has advocated that the Federal Energy Regulatory Commission should

have greater authority to order a utility to provide transmission services on a case-by-case basis, subject to the findings that the order would conserve energy, promote efficient use of facilities and resources, and increase competition or otherwise promote the public interest," Richardson said.

The view on pricing excess capacity is also similar. "APPA and LPPC agree on the importance of cost-based pricing for excess transmission, at least in those situations where competitive transmission markets do not exist," Richardson was quoted as saying.

Who should generate electric power in the future?

Is it really in the public interest for competition to be injected into the bulk power supply industry? And if so, shouldn't the decision of just who should be allowed to provide the power be left to competitive marketplace decisions?

Unfortunately, such basic questions as these often seem to get lost in the infighting among various factions with specific interests. Consider the amendment to S.406, the Senate bill dealing with Arctic oil and gas leasing, offered by J. Bennett Johnston (D-LA), chairman of the Senate Energy and Natural Resources Committee. The amendment would change the Public Utilities Holding Company Act to allow formation of exempt wholesale generators to make and sell electricity to electric utilities and bulk power customers.

Even though the proposal has not been slated for hearings, debate has begun in earnest. Johnston's political weight is enough to make both sides believe something is going to happen.

Lining up behind the amendment are the nation's largest electric utilities, who would gain substantially greater flexibility in financing, establishing, and operating subsidiaries to generate power to be sold on the open market. Gas producers, who would profit from anticipated greater use of their fuel also are behind it. There also is support from some competition-oriented politicians.

On the other side are consumer groups, publicly-owned electric utilities and large power users concerned that they would lose leverage and face higher prices, and a number of regulators that fear they would lose jurisdictional control.

It seems to us that the Johnston amendment may provide the medium by which the real question...whether or not competition in the generation of electricity is in the public interest...can be answered once and for all. This would include consideration of all aspects of power supply: availability, reliability, price and quality. If the answer is yes, then the decision of who should provide the power should be left to the marketplace, where competitive evaluations of those factors can best be made.

If, as we expect, the decision is that competition is in the best public interest, then it would seem only fair that all potential producers, including independent power production companies, financial consortia, utilities, potential co-generators and others should have an equal, but only equal chance in what-ever market they choose to enter.

PURPA created some devastating inequities in the name of energy conservation and efficiency. The Johnston amendment would go a long way toward evening out the playing field.

Leader of the pack?

Hats off to Wisconsin Power & Light Co. for becoming the first utility in the country to announce that it is actively seeking permission from the Federal Energy Regulatory Commission to make its transmission system available to any and all wholesale customers that might want to purchase energy from someone else. The company in mid-September announced it had filed a tariff with FERC that would allow all its municipal, co-op and investor-owned utilities open access to its transmission system.

But WP&L President Erroll Davis isn't giving up anything, at least without a fight. In announcing the filing, he declared that the company believes the key to remaining strong and competitive "is to provide the best, low-cost service in its marketplace, instead of depending on artificial regulatory barriers to keep competing suppliers out."

Wisconsin utilities were recently prodded by their state commission to move in this direction. We salute the company for its actions, and for reacting positively to the winds of change in the industry. Company management obviously believes the company is, and will continue to be competitive. And if it is, that spells good things for everyone—customers, employees and shareholders.

Robert A. Lincome, Editor-in-Chief

Should have been...

One of the best-read issues in the electric utility industry trade press during any year is your August issue with its annual listing of the top operating performances of utilities. That was proved to me when a number of associates called to my attention the absence of Toledo Edison's Bay Shore units from their perennial place in your list of top twenty generating units by heat rate.

Upon checking, we found that Bay Shore was omitted from your list because Toledo Edison's parent company, Centenor Energy, missed your deadline for providing information. Had our data reached you in time, Bay Shore would have placed 20th on your list. The 142-MW unit had a heat rate of 9,358 Btu/kWh in 1988.

Our apologies for dropping the deadline ball; Bay Shore is much more efficient at generating electricity than we are at generating statistics.

Stephen G. Lorton
Director, Public Affairs
Centenor Energy
Cleveland, OH

Lightning protection

Close attention should be paid to the findings of Doug Criner of Burns & McDonnell, Mr. Bird and Mr. Karmazyn of W.J. Furse & Co. and Mr. Barker and Mr. O'Neill of Trent Polytechnic, which were reported in "Does lightning protection protect power systems?" (June EL&P, p. 38).

It is one of the first articles that I have read in any of the more respectable trade journals that suggests that the market for surge protectors is a big joke that has actually been played on the 11-million personal computer operators in the U.S. through the deceitful marketing ploy of beneficial, but obscure advertising.

Of course there is no way that an MOV, silicon diode, gas tube or combination of the three can protect integrated circuits from transients caused by lightning. Thus, the plug-in and hard-wired devices (the good ones, like Panamax Supermax and Dynatech S100) are technically known as surge protectors, and not lightning arrestors (which is a term that applies only to those devices that protect service entrances). Surge suppressor components are specifically designed to absorb or divert predetermined voltage levels, such as those that are the result of line switching by the power company. Gas tubes, for instance, will begin operating at high-voltage transient levels, while the MOV will begin operating at low transient-voltage levels. The MOV, however, cannot handle high-voltage transient levels, and low-voltage transients, which will not trigger gas tubes, are still powerful enough to damage integrated circuits.

Moreover, any manufacturer or sales representative that might suggest that his or her surge protector can prevent

delicate computer circuits from transients caused by lightning is simply not educated in the fine points of common sense. A lightning stroke carries millions of volts of electricity and is five-times hotter than the surface of the sun. Thus, it just makes sense that the little box under the desk, or wired in the wall, will simply conduct the transient right through the powerline, the computer and even end-user, whatever is the quickest path to ground.

So remember, the only real protection from transients is to unplug your computer when the weatherman says there is a storm coming. Or if you are concerned with downtime, just make sure your warranty is up to date and that you constantly back up your hard disks with floppies.

Dennis M. Zogbi, Research Analyst
World Information Technologies
Northport, NY

(Mr. Zogbi also is co-author of "1989 Analysis of U.S. Electrical and Electronic Surge Protection Markets")

For more on the problems of protection and power quality, see Hank Stein's "Information/Control Systems" column, p.34 of the August issue.

Dead poets and ridicule

I saw the movie "Dead Poets Society" on the weekend before reading Chuck Rhodes' letter to the editor in the July issue of EL&P (p.4) the following Monday morning. One particular movie scene replayed in my mind as I read Rhodes' criticism of Ted Pollock for suggesting the judicious use of ridicule as a legitimate management tool for behavior modification in EL&P (May, p.60).

Those who've seen the movie may recall one of the opening scenes, where actor Robin Williams' "Captain, oh Captain" teacher-character, Mr. Keating, ridicules timid young student "Anderson" in front of the class when Anderson didn't do the homework assignment—compose an original poem to be read in front of the class. I squirmed and nervously rocked in my cushioned theater recliner as Keating mercilessly badgered and humiliated the quivering Anderson, when, lo, the kid reacts with poetic sensitivity the likes of which he never knew he had within him. The scene ends with Keating's whispered "Don't you ever forget this!" I'll leave it to EL&P readers to find out whether or not Anderson learned his lesson.

Ridicule is like dynamite. Ya gotta know if, when and how much of it to use. But this is certain—the lessons we learn through ridicule are as powerful as they are unforgettable.
Peter Kushkowski
Northeast Utilities
Haddam, CT

Peter Kushkowski is a frequent commentator on events and non-events affecting the electric utility industry, EL&P and EL&P's readers.

Increase salaries to keep engineers

WASHINGTON—Salary was the most common reason for seeking a new position, according to a survey in The Last Word, an American Consulting Engineers Council newsletter.

Results

Citing a recent A/E Job Mart's Reader Survey, of 288 respondents, 27 percent said they are not paid enough; 24 percent, lack of advancement opportunity;

17 percent, lack of professional growth; 12 percent, no appreciation for what they do; and 6 percent, inability to get ownership.

Job dissatisfaction

Because of job dissatisfaction, 26 percent of those surveyed are contemplating changing jobs within a year. More than 80 percent said they planned to relocate.

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